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DESCRIPTIONS OF NEW GENERA AND SPECIES OF SIAMESE FISHES

BY

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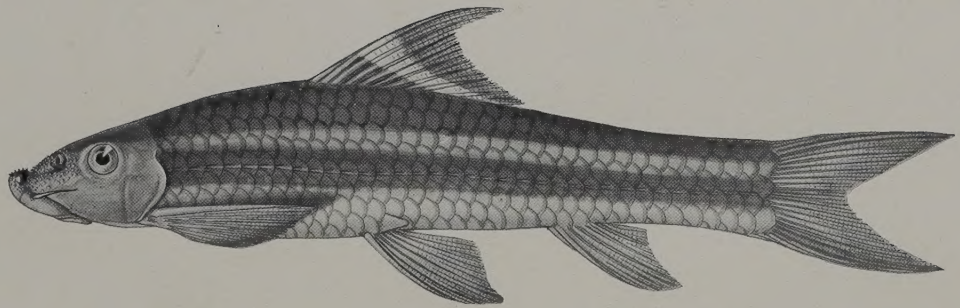

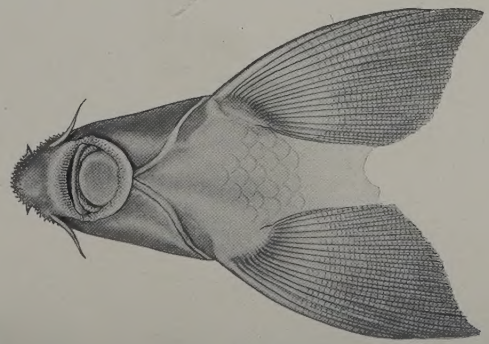

GARRA TAENIATA

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DESCRIPTIONS OF NEW GENERA AND SPECIES OF SIAMESE FISHES

By Hugh M. Smith
Adviser in Fisheries to His Siamese Majesty's Government

The collections of fishes made by the writer, his assistants, his friends, and his associates in other branches of the governmental service of Siam during the years 1923–1930 have comprised many thousands of specimens from all sections of the coast and interior. While the field is by no means exhausted, the collections afford a very fair idea of the fish life of the salt, brackish, and fresh waters of the country, and are particularly rich in material from the large and small rivers and the inland swamps, lakes, and canals.

In advance of the preparation of a general account of the fish fauna of Siam, it is thought advisable to place on record some of the apparently undescribed genera and species that have been met with. This paper enumerates 8 new genera and 33 new species belonging in 7 families, as follows:

Cobitidae—Loaches.
- *Botia beauforti*, new species.
- *Botia horae*, new species.

Cyprinidae—Minnows and Carps.
- *Laubuca caeruleostigmata*, new species.
- *Danio kerri*, new species.
- *Danio pulcher*, new species.
- *Labeo bicolor*, new species.
- *Cyclocheilichthys tapiensis*, new species.
- *Puntius wetmorei*, new species.
- *Puntius stigmatosomus*, new species.
- *Poropuntius normani*, new genus and species.
- *Barilius koratensis*, new species.
- *Barilius pulchellus*, new species.
- *Garra taeniata*, new species.
- *Epalzeorhynchus siamensis*, new species.
- *Scaphognathus stejnegeri*, new genus and species.

BAGRIDAE—BAGRID CATFISHES.
Mystus havmolleri, new species.

PANGASIIDAE—PANGASSIID CATFISHES.
Pangasius cultratus, new species.
Pangasius beani, new species.
Pangasius fowleri, new species.
Pangasius sanitwongsei, new species.

ARIIDAE—SEA CATFISHES.
Arius sciurus, new species.

SYNAPTURIDAE—SOLES.
Synaptura aenea, new species.

GOBIIDAE—GOBIES.
Gobiella pellucida, new genus and species.
Thaigobiella sua, new genus and species.
Pogonogobius, new genus.
Eugnathogobius microps, new genus and species.
Pipidonia quinquecincta, new genus and species.
Herrea formosa, new genus and species.
Creisson sealei, new species.
Paragobiodon kerri, new species.
Rhinogobius similis, new species.
Rhinogobius atripinnatus, new species.
Cryptocentrus leonis, new species.
Apocryptodon malcolmi, new species.

By permission of His Excellency Chao Phya Baladeb, Minister of Lands and Agriculture in the Cabinet of His Majesty the King of Siam, the type specimens of the fishes herein described have been deposited in the United States National Museum.

BOTIA BEAUFORTI, new species

Description.—Body oblong, much compressed, the depth 4.3 in standard length, the width at dorsal fin more than 0.5 its depth; caudal peduncle deeper than long, its depth about 0.75 depth of body; dorsal profile a flat, regular curve from snout to caudal, the ventral profile much more arched; head 3.75 in standard length, rather sharply pointed; eye in posterior half of head, small, 9 in head, 4.5 in snout, and nearly 2 in the strongly convex interorbital; the strong, bifid preorbital spine scarcely below level of eye and extending to pupil; mouth small, strongly curved, extending half way from tip of snout to nostrils, lower jaw included; lips thick, tumid, each with a median cleft, lower lip with a rounded mass on each side of symphysis; 6 simple barbels, the 4 rostral ones

forming a long tuft at tip of snout, the 2 maxillary barbels behind angle of mouth, all more than twice diameter of eye.

Fins: Dorsal rays ii,9, the first branched ray more than 0.5 head and equal to base of fin, origin of fin midway between tip of snout and base of caudal; caudal shorter than head, very broad, widely forked, lobes rounded; anal rays ii,5, longest ray less than snout, length of its base less than 0.5 depth of caudal peduncle, origin of fin far behind dorsal base; ventrals inserted under second dorsal membrane, the longest ray equal to longest anal ray, a conspicuous axillary scale; longest pectoral ray exceeds longest dorsal ray and equals snout plus eye.

Color: Body and head light gray-green; sides with 4 irregular longitudinal rows of small, rounded, dark brown spots each surrounded by a pale area; about 5 parallel longitudinal dark brown lines extending on each side of back from head for two-thirds distance to dorsal fin, followed by an area of small dark brown spots

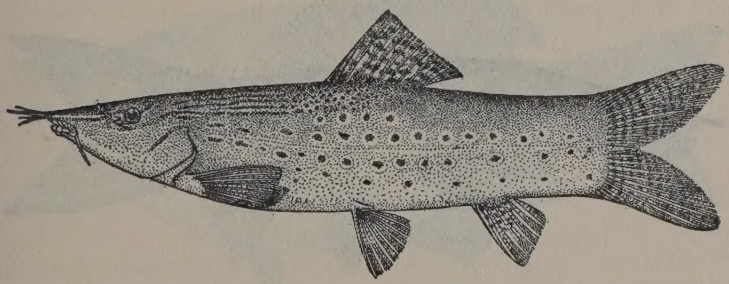

FIGURE 1.—BOTIA BEAUFORTI

extending to posterior end of dorsal base; head with several dark brown curved stripes, mostly about eye, one on opercle, one from eye to tip of snout; dorsal and caudal fins bright orange, with rows of black spots; anal fin yellow, with a few brown spots on basal part; ventral and pectoral fins pale orange.

Type.—A specimen 17.5 cm. long, taken in Tadi Stream, Ban Kiriwong, Nakon Sritamarat, Peninsular Siam, July 11, 1928. Cat. No. 90285, U.S.N.M.

Remarks.—This species is rare in the upper waters of Tadi Stream and tributaries. Only one specimen was obtained, but the people at Ban Kiriwong know the fish and call it *pla mu* (hog fish), a name shared by no other species in that section. The maximum size attained, according to local people, is about half longer than the type.

The nearest relative of this species appears to be *Botia berdmorei* (Blyth), from Burma. As described and figured by Day,[1] that

[1] Fishes of India, p. 607, pl. 154, fig. 3.

species presents a number of differences in form and color, such as 11 to 13 branched dorsal rays (instead of 9), origin of ventral slightly in advance of dorsal (instead of considerably behind), depth of caulal peduncle less than its length (instead of more), 10 or 11 dark vertical cross bands extending from back of abdomen (instead of none), the absence of parallel black stripes on the back anteriorly, etc.

This species is named for Dr. L. F. de Beaufort, of Amsterdam, accomplished coauthor of Fishes of the Indo-Australian Archipelago.

BOTIA HORAE, new species

Description.—Moderately elongate, compressed, depth 3.6 in standard length; caudal peduncle short and deep, its least depth less than its length and two-thirds depth of body; dorsal and ventral outlines similar; head 3.25 in length; eye 5.5 in head, more than 2 in

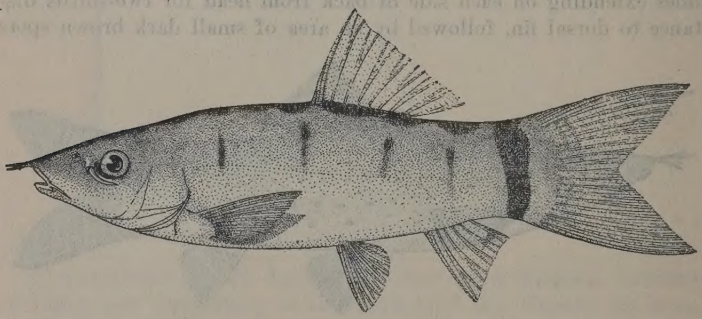

FIGURE 2.—BOTIA HORAE

snout and less than interorbital space; mouth small, semicircular, rictus less than eye; 6 short, subequal barbels, all less than eye; suborbital spine strong, longer than eye, extending to a point under posterior edge of pupil.

Fins: Dorsal rays ii,8, margin of fin nearly straight, first branched ray as long as snout and eye and about two-thirds depth of body, origin of fin slightly in advance of ventrals and nearer base of caudal than to tip of snout; caudal as long as head, broad, deeply forked, the lobes pointed; anal rays ii,5, origin of fin slightly posterior to dorsal base, longest ray less than depth of caudal peduncle; ventrals shorter than pectorals whose first ray exceeds first dorsal ray and is 1.5 in head.

Color: Pale yellowish green; a median dorsal stripe from tip of snout to beyond dorsal fin, the stripe formed by jet black rounded spots and blotches joined by dark areas; a broad jet black cross-

band near middle of caudal peduncle, the bands on the two sides meeting above and below; 4 narrow, vertical blackish bands on side mostly above lateral line, the first above pectoral, the second slightly in advance of dorsal, the third under posterior part of dorsal base, the fourth over anal; fins mostly plain, several vague dark lines across base of caudal, an obscure dark blotch on posterior part of anal.

Type and paratype.—The type, 4.0 cm. long, was taken in the west fork (Kwe Noi) of the Meklong, Western Siam, September 24, 1929. Cat. No. 90286, U.S.N.M. A paratype is 3.7 cm. long.

Remarks.—This attractive and easily recognized little cobitid is named for Dr. Sunder Lal Hora, of the Indian Museum in Calcutta, in slight recognition of his valuable studies of Siamese, Burmese, and Indian fishes.

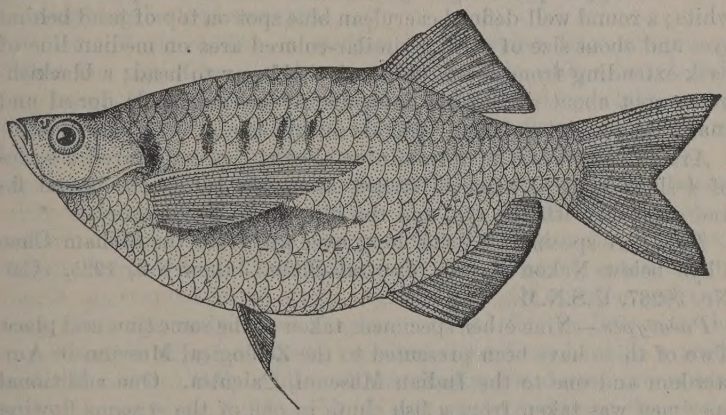

FIGURE 3.—LAUBUCA CAERULEOSTIGMATA

LAUBUCA CAERULEOSTIGMATA, new species

Description.—Form short, deep, greatly compressed; upper profile from snout to dorsal slightly curved, with a slight concavity at nape; profile from chin to ventrals very steep, ventral curvature greater than dorsal; depth 2.25 in standard length; caudal peduncle short, deeper than long, 0.5 head; head sharp, short, 4.2 in standard length; mouth small, almost vertical, lower jaw slightly longer, its tip on level with upper margin of eye, angle of mouth not reaching vertical from anterior margin of eye; eye 3.5, in anterior half of head, 1.5 in interorbital space, and slightly less than snout; scales larger anteriorly, about 35 in lateral line, 13 in transverse series between origins of dorsal and anal, 12 around caudal peduncle,

19 in predorsal region; lateral line markedly decurved, running on lower half of caudal peduncle, and separated by 4.5 or 5 rows of scales from ventral base and by 8.5 or 9 rows from dorsal origin.

Fins: Dorsal placed far backward, its origin opposite that of anal and midway between anterior edge of pupil and tip of upper caudal lobe, its longest rays equal to its base and to head less snout; dorsal rays ii,11; caudal longer than head, deeply forked; anal base as long as caudal, its margin slightly rounded, the longest rays shorter than dorsal rays; rays ii,22; ventrals placed a little above edge of abdomen, their first ray produced into a filament, more than 0.5 pectorals and reaching anal aperture; pectorals very long, more than 1.75 times length of head, their tip nearly reaching a line from origins of dorsal and anal.

Color: Upper parts light green, sides and lower parts silvery white; a round well-defined caerulean blue spot on top of head behind eyes and about size of eyes; a similar-colored area on median line of back extending from dorsal fin nearly half-way to head; a blackish-green spot about size of eye immediately behind head; dorsal and anal hyaline, pectorals and ventrals dusky, caudal very pale blue.

After preservation in formalin or alcohol there appeared a series of 4 short vertical blackish stripes alongside before the dorsal fin and on level with the eye, and the blue spots disappeared.

Type.—A specimen 6.2 cm. long over all, from the Menam Chao Phya below Nakon Sawan, Central Siam, January 5, 1925. Cat. No. 90287, U.S.N.M.

Paratypes.—Nine other specimens taken at the same time and place. Two of these have been presented to the Zoological Museum in Amsterdam and one to the Indian Museum, Calcutta. One additional specimen was taken from a fish chute in one of the streams flowing out of Borapet Swamp, near Paknampo, Central Siam, November 20, 1923, and another in the Menam Chao Phya near Chainad, Central Siam, in December, 1924.

Remarks.—The color of the back of this fish harmonizes with the water and makes the fish almost invisible from above, except for the two brilliant caerulean spots on the top of the head and the median line of the back before the dorsal fin. Fishes kept alive in a pail of river water and viewed from above were quite inconspicuous except for the blue spots. Exceptionally 7 to 9 dark vertical stripes appear along the side in formol specimens.

DANIO KERRI, new species

Description.—Moderately elongate, the depth 3.3 in standard length; head equal to depth; eye about equal to snout, 4 in head, 1.25

in interorbital space; two pair of slender barbels, the rostral extending behind eye, the maxillary slightly beyond gill opening; least height of caudal peduncle 2 in head; no lateral line; scales in lateral series 31, in transverse series 9, 16 scales before dorsal, caudal peduncle surrounded by 10 scales in its narrowest part; head profusely covered with tubercles probably indicative of the breeding condition, one conspicuous oval patch of tubercles at outer angle of lower jaw, with a linear patch inferior and posterior thereto, another elongated patch below eye, and other tubercles above eye, on lower lip, and on chin.

Fins: Dorsal rays ii,7, origin of fin in advance of anal, over 14th scale of lateral series, its height more than 0.5 head; cadual deeply emarginate, as long as head; anal rays ii,2, height of fin equal to dorsal; ventrals short, not reaching vent; pectorals shorter than head, not reaching base of ventrals.

Color: Back reddish, a median bluish stripe from occiput to dorsal fin; top of head and muzzle bluish; side with a broad, dull blue band which extends on opercle and is traversed by bright scarlet lines as follows: a continuous straight stripe from upper end of branchial opening to caudal base, becoming wider posteriorly; a somewhat broader, wavy stripe beginning on sixth scale of lateral series and extending to lower edge of caudal peduncle immediately posterior to anal fin; a short stripe between the above two, reaching slightly further back than anal origin and decurved anteriorly; a fourth interrupted broad stripe beginning at gill opening and running along the body above the base of anal fin; in line with the upper margin of eye a line of vermiculations from head to a point under dorsal fin; belly white; all fins dusky, the dorsal and caudal with pale red edges, a diffuse bluish spot on the middle of the caudal base, the anal with pale red rays.

Type.—A male specimen 4.2 cm. long over all, 3.3 cm. to base of caudal, collected in a pool in a hill stream on Koh Yao Yai, west coast of Siam, March 4, 1929. Cat. No. 90289, U.S.N.M.

Additional specimens.—There are 3 other specimens taken at the same place and time, the largest a male 3.7 cm. long, the other apparently females 3.3 and 3.5 cm. long. The male exhibits the same nuptial tubercles as the type, and the other specimens show no such organs. In all of these specimens the maxillary barbel extends well behind the branchial opening.

Remarks.—The species is somewhat like *Danio albolineata* (Blyth), known from Burma, Penang, and Sumatra, which has an incomplete lateral line and a single scarlet band which extends along the side from the caudal base to a point under or slightly in advance of the

dorsal fin. The only other species of the genus which this new form resembles is *D. rerio* (Hamilton Buchanan), known from Eastern India, in which there are on the side 4 metallic blue lines separated by 3 silvery ones, together with 3 to 6 blue bands on the caudal fin and 3 blue bands on the anal.

The species is named in honor of Dr. A. F. G. Kerr, botanist of the Siamese government, who collected the type and cotypes.

DANIO PULCHER, new species

Description.—Similar to *D. albolineatus* (Blyth) from Sumatra and Burma, but the lateral line absent and the coloration markedly different. The barbels are in two pairs and well developed, the dorsal and anal rays are in reduced number, and the scales are relatively large. Depth of body contained 3.5 times in standard length, 4.5 in total length; head short, blunt, 4.2 in standard length, 5 in length to fork of tail, 1.2 in depth of body; least depth of caudal peduncle less than 0.5 head; eye situated low on side of head, 3 in head, longer than snout and 0.75 interorbital space; mouth nearly vertical, lower jaw slightly projecting, maxillary not reaching vertical from anterior border of eye; rostral barbel 2 times eye, 0.5 maxillary barbel, extending beyond preopercle; maxillary barbel reaching far beyond base of pectoral; lateral line entirely absent; scales in lateral series 34, in transverse series 9, around caudal peduncle 12.

Fins: Dorsal rays ii,7; origin of fin well in advance of anal, longest ray less than head; caudal deeply emarginate, much longer than head; anal rays iii,15, longest ray somewhat less than head without snout, and base scaly and about equal to head; ventrals extending to vent; pectorals long, equal to head and nearly reaching ventrals.

Color in life: General color of back and sides pale green, top of head darker green; belly and chin pale yellow, chest pale orange, flank above anal fin and lower side of caudal peduncle pale blue; a narrow indigo blue median dorsal stripe from head to front of dorsal fin and from posterior end of dorsal to caudal fin; a narrow, diffuse, dull orange band on back from head to caudal fin, separated from a median blue stripe by a narrow space; a bright orange-red lateral band from gill opening to base of caudal fin gradually becoming wider posteriorly; below this band a similar one of Antwerp blue; the orange-red band bordered above posteriorly by a narrower band of Antwerp blue, and the blue band bordered below posteriorly by a narrower band of orange-red; iris pale, with spots of crimson lake; dorsal fin pale green at base, a band of darker green extending midway its length, the distal part of fin chrome yellow,

with a broad bright vermillion margin; caudal fin pale green, the central part and the posterior margin scarlet; anal fin scarlet at base, a medial band of deep green, the distal half chrome orange, with a narrow sky-blue edge; ventrals pale yellow at base, merging into pale gree distally; pectorals pale green, the first ray darker and sharply defined. In formalin, the lateral bands remain distinct, but the red color becomes white and the blue becomes blackish.

Type.—A male specimen 32.5 mm. long over all, taken in a waterfall stream at Pliew, Chantabun Province, Southeastern Siam, April 9, 1925. Cat. No. 90290, U.S.N.M.

Paratypes.—Five specimens taken at same place and date, 4 of them males from 30 to 32.5 mm. long, 1 a female 37.5 mm. long with ripe eggs.

Remarks.—This species falls in the subgenus *Brachydanio* of Weber and Beaufort, characterized by having the lateral line incomplete or absent and 7 branched rays in the dorsal fin. It is one of the smallest members of the genus, apparently surpassed in diminutiveness only by *D. nigrofasciatus* Day from Burma which does not exceed 25 mm.

The fish is thus far known only from the waterfall stream at Pliew, where it was collected by Luang Masya Chitrkarn, of the Siamese Department of Fisheries. The fish seems to be restricted to the upper part of the stream where it flows over and among boulders and between banks densely overgrown with trees and other vegetation.

The only species of *Danio* heretofore recorded from Siam is *D. aequipinnatus* (McClelland), of India, Ceylon, and Burma, known only from the Nakon Sritamarat Mountains in Peninsular Siam.[2]

LABEO BICOLOR, new species

Description.—Form elongate, moderately compressed, depth 3.5 in standard length; head slightly less than depth, subconical; snout obtusely pointed, overhanging the mouth, and with a small lobe and a deep groove on each side; eye in the middle of length of head, 4.5 in head, 1.5 in snout, and somewhat less than 2 in the strongly convex interorbital space; mouth moderate, transverse, a long postlabial groove extending straight backward; 2 pairs of barbels of equal length, about equal to eye, the rostral pair close together, separated by a space equal to half eye and extending to angle of mouth; scales in lateral series 34, in transverse series 6–1–7, scales before dorsal 11, scales around caudal peduncle 16; lateral line nearly straight.

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[2] See Journ. Nat. Hist. Soc. Siam, vol. 6, p. 153.

Fins: Dorsal large, slightly emarginate, its origin well in advance of ventral base, opposite 10th scale of lateral line, the rays ii,13, first branched ray about equal to depth of body; caudal deeply forked, its pointed lobes longer than head; anal rays iii,5, the longest reaching nearly to base of caudal but shorter than longest dorsal ray; ventrals extending to anal; pectorals somewhat shorter, not reaching ventrals.

Color: Entire body and all fins except caudal and pectorals uniform black; in larger specimens the belly and under side of head may be bronze; caudal and pectorals bright orange, the color of the caudal extending on the caudal peduncle and involving the last 2 or 3 transverse rows of scales; in small examples a narrow whitish edge to dorsal and anal.

FIGURE 4.—LABEO BICOLOR

Type.—A specimen 10.8 cm. long over all, 8.5 cm. to base of caudal, taken November 19, 1923, in a fish chute in a small tributary of the Menam Chao Phya near Paknampo, Central Siam. Cat. No. 90291, U.S.N.M.

Other specimens.—In addition to a number of specimens forwarded to foreign correspondents, the collection of the Siamese Department of Fisheries contains 10 specimens taken from a small stream near Paknampo November 20, 1923, and several specimens taken in the Menam Chao Phya at Nontaburi in December, 1921, by Dr. Malcolm Smith.

Remarks.—This fish is not uncommon in Borapet Swamp, Central Siam, and in the streams leading therefrom. It is reported to be very common at times at Hangkraben, above Ayuthia, and occurs also in the Menam Chao Phya as far south as Bangkok. The maximum length appears to be about 12 cm. In the Paknampo region the fish is called *pla song kruang* (full-dress fish).

The nearly uniform rich velvety black of the body and most of the fins is strikingly relieved by the bright orange color of the caudal and pectoral fins, making this one of the most beautiful of the many attractively colored cyprinoid fishes of Siam. Specimens preserved in alcohol or formalin ultimately become brown, and there appears on the side above the lateral line a short distance behind the head a small round black spot that is scarcely visible in life; one or two smaller spots sometimes appear beneath the other.

CYCLOCHEILICHTHYS TAPIENSIS, new species

Description.—Back moderately elevated, the dorsal profile from nape to dorsal fin gently curved; depth 3 in standard length; least depth of caudal peduncle 2.5 in head; head about 3.5 in standard

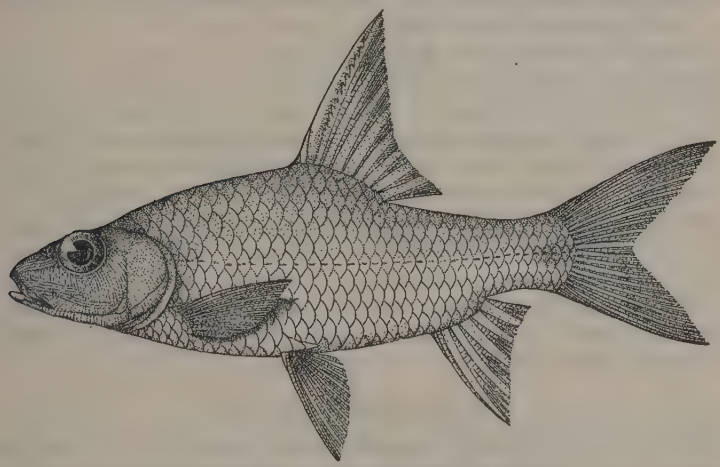

FIGURE 5.—CYCLOCHEILICHTHYS TAPIENSIS

length; eye large, about equal to snout, 3.2 in head, and about 1 in the slightly concave interorbital space; 2 pairs of barbels, the rostral minute, the maxillary less than 0.5 diameter of eye; lines of sensory pores on sides and top of head very prominent; scales in longitudinal series 37, in transverse series 6–1–6.5, around narrowest part of caudal peduncle 16, in predorsal region 12.

Fins: Dorsal origin behind that of ventrals and midway between tip of snout and base of caudal; dorsal rays iv,8, the fourth simple ray strongly denticulated on posterior border, its length equal to head; caudal deeply forked, the lobes pointed and as long as head; anal rays iii,5, the third simple ray osseous and as long as head less snout; ventrals extending beyond vent but not reaching anal; pec-

torals 0.75 head, equal to ventrals and extending slightly beyond their base.

Color: Plain silvery, a round dusky spot on caudal peduncle; fins hyaline.

Type.—A specimen 13.0 cm. long taken in the Tapi River near Bandon, Peninsular Siam, September 30, 1923. Cat. No. 90294, U.S.N.M.

Other specimens.—The collection of the Siamese Department of Fisheries contains a specimen 16.0 cm. obtained from Bandon Bight, Gulf of Siam, September 19, 1923, where it had evidently strayed in the flood water from the Bandon River; and a second specimen, 12.0 cm. long, from the Tapi River near Bandon, September 30, 1923, which shows faintly a dark brown spot at the base of each of the scales on back and sides and a small round dark brown spot on caudal peduncle at base of fin.

Remarks.—This species is closely related to *C. armatus*, known from Sumatra, Java, and Borneo as well as from Siam, but differs therefrom in having a much less steep and arched dorsal profile, more slender body, more elongate caudal peduncle, and plainer coloration. From Bleeker's *C. dumerili*, known from a single specimen from Bangkok and imperfectly described by Sauvage,[3] this form appears to differ in having a longer head, larger eye, more scales in transverse series, and longer dorsal fin arising well behind the origin of ventrals instead of a little in advance.

This fish at Bandon is known as *pla kamprad* (slippery fish). It is reported to be a small form, not exceeding in size the largest specimen herein listed.

PUNTIUS WETMOREI, new species

Description.—Form elongate, moderately compressed, dorsal and ventral profiles similar; back slightly arched, a slight concavity at nape; depth 2.6 in standard length; least height of caudal peduncle about equal to eye and 0.8 its own length; head 4 in length; eye large, equal to snout, 0.2 less than postorbital part of head and 1.3 in interorbital space; snout rounded, jaws nearly equal, lips thin, mouth small, maxillary not reaching vertical from anterior margin of eye; barbels 4, short, rostral pair reaching eye, maxillary pair longer but less than diameter of eye; scales large, 23 or 24 in lateral line, 5.5–1–4.5 intransverse serise, 8 before dorsal, 12 surrounding narrowest part of caudal peduncle; lateral line decurved and irregular but complete.

Fins: Dorsal rays iv,8; origin of fin opposite ventrals and over eighth scale of lateral line, nearer to tip of snout than to base of

[3] Recherches sur la fauna ichthyologique de l'Asie et description d'espèces nouvelles de l'Indo-Chine, 1880.

caudal, free margin deeply concave, the last ray produced; fourth unbranched ray strong, osseous, bearing 8 very large teeth on its posterior edge, its length somewhat more than head; caudal deeply forked, the pointed lobes longer than head; anal rays iii,5, the longest 0.8 head and reaching caudal, the posterior edge of fin deeply emarginate; ventrals 0.8 head, reaching vent, their base separated from lateral line by 2.5 scales, a large scale in axil; pectorals of same length as ventrals.

Color: Back reddish-brown, sides and under parts golden; a very distinct rounded greenish spot on side above pectoral base (disappearing in formol); a dark area on opercle; dorsal fin pale greenish-yellow, dark edged; caudal pale green, margin dark, inferior part of lower lobe yellow; anal, ventrals, and pectorals bright orange.

Type.—A specimen 12.5 cm. long from the Menam Chao Phya at Chainad, Central Siam, January 5, 1925. Cat. No. 90295, U.S.N.M.

Remarks.—This is a well-marked form characterized by large scales, a very strong coarsely-serrated fourth dorsal ray, two pairs of barbels, a complete lateral line, and brilliant coloration. In some of its features the species resemble *P. anchisporus* from Borneo, but is more elongate, has a less strongly arched dorsal profile, has fewer scales surrounding the caudal peduncle and is of very different coloration. *P. sumatranus*, from Siam, Sumatra, and Borneo, has no rostral barbels, has an incomplete lateral line, and has 4 dark crossbands on head and body. In the widely-distributed *P. notatus* the barbels are longer, the dorsal margin is truncate, the fourth simple dorsal ray is shorter, the anal is much shorter, the body usually has a round black spot under dorsal fin and another on caudal peduncle, and there are other dissimilar features.

This species is named in honor of Dr. Alexander Wetmore, assistant secretary of the Smithsonian Institution in charge of the United States National Museum.

PUNTIUS STIGMATOSOMUS, new species

Description.—Dorsal profile moderately arched; depth of body 3.2 times in standard length, a little less than 4 in total length; head 3.75 in standard length; eye equal to snout and interorbital space, and contained 3.25 times in length of head; mouth strongly arched, subterminal; a barbel at corner of mouth about equal to eye, no rostral barbels; caudal peduncle broad, its depth about two-thirds its length and more than 0.5 head; scales large, 26 in lateral line and 9 in transverse series, 4.5 rows being above the lateral line, and 2.5 rows between lateral line and base of ventrals, 10 predorsal scales, 12 scales around narrowest part of caudal peduncle; thin scales extend from the body on the bases of the dorsal and anal fins and form a sheath; lateral line moderately decurved, the pores weakly developed.

Fins: Dorsal rays ii,8, the second simple ray osseus and serrated; origin of fin posterior to origin of ventrals, over eighth scale of lateral line and much nearer to end of snout than to base of caudal; dorsal fin high, nearly 0.75 depth of body and 0.8 length of head, its posterior margin truncate; caudal as long as head, deeply forked, the lobes pointed; anal rays iii,5, the simple rays weak and unossified; pectorals rounded, 1.3 in head, reaching ventrals and somewhat longer than they, which do not extend to anal.

Color: Upper part of body and top and sides of head greenish, below silvery white; a row of four roundish black spots on side, the first near head, the second under dorsal, the third above anal origin, the fourth on caudal peduncle on both sides of the lateral line; an-

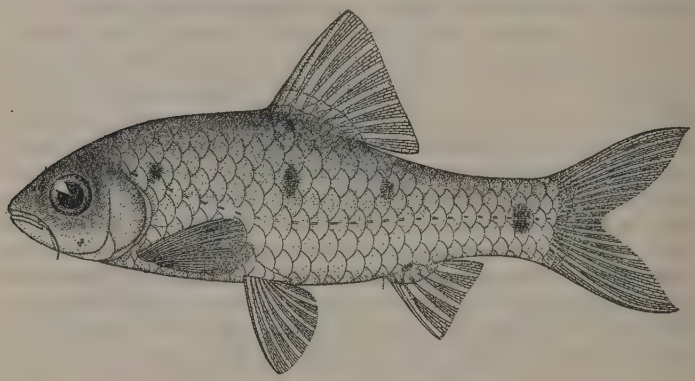

FIGURE 6.—PUNTIUS STIGMATOSOMUS

other small round black spot immediately under the first branched dorsal ray; a smaller black spot above the anterior part of anal; fins hyaline.

Type.—A specimen 5.5 cm. long, collected by Luang Masya Chitrkarn, of the Siamese Department of Fisheries, April 27, 1927, at the waterfall in Pliew Stream, Kao Sabap, near Chantabun, Southeastern Siam. Cat. No. 90296, U.S.N.M.

Remarks.—Similar to *P. binotatus*, known from Siam, Straits Settlements, and Indo-Australian Archipelago, but differing therefrom in absence of rostral barbels (which in *notatus* are longer than eye), in more anterior position of the dorsal fin, and in pattern of coloration.

POROPUNTIUS, new genus

Moderately elongated and compressed; snout bluntly rounded, its median part covered with rows of large pores, the pore-bearing area defined laterally by a deep groove; mouth subterminal, lips con-

tinuous, lower lip with a postlabial groove which is interrupted in the middle by a short space; a sulcus separating lower lip from lower jaw, which is included and has a horny covering; rostral and maxillary barbels well developed, the former inserted at the base of the rostral groove; scales large; dorsal fin with 8 branched rays, its last simple ray osseous, stout, and strongly denticulated; anal with 5 branched rays, its simple rays unossified; gill-membranes joined to isthmus.

This genus resembles *Lissochilus* from Southern Asia and Sumatra, in having the lower jaw covered with a horny sheath and a deep sulcus separating it from the lower lip. The pores on the snout in *Lissochilus* are surmounted by horny tubercles which extend to below the eye, and the last simple dorsal ray is weakly ossified and not denticulated. There is no rostral groove.

In *Puntius* the last simple dorsal ray may be ossified and serrated, but there are no pores on the snout, no horny sheath on lower jaw, and no rostral groove.

In the Bleekerian genus *Barbodes*, which Weber and Beaufort place in the synonymy of *Puntius*, the essential character is the possession of 4 barbels. The Indian cyprinids placed by Day (Fishes of India) in the *Barbodes* group of the composite genus *Barbus* include some forms which have the last simple dorsal ray denticulated and one of those species, *B. chaganio*, has pores on the snout and other parts of the head; this fish, however, has no horny covering on the lower jaw and no rostral groove; and in the only Indian species (*B. lithopidus*) mentioned as having a covering on the lower jaw (Day's description reads: "a thin cartilaginous covering internally to either jaw") the last simple dorsal ray is not denticulated or even osseous and there are no rostral pores. The type species of *Barbodes* as designated by Bleeker is *belinka*, known from Sumatra and Malacca. It has the last simple dorsal ray coarsely denticulated, no rostral pores, and no rostral groove.

POROPUNTIUS NORMANI, new species

Description.—Dorsal and ventral outlines similar; depth 3 in standard length; least depth of caudal peduncle 1.5 in its length and 2 in head; head 4 in length; eye large, close to upper profile, 3.2 in head, equal to snout, slightly less than flat interorbital space; snout obtusely rounded, slightly overhanging the upper lip which is separated from the snout by a deep groove; middle third of snout with a short vertical groove on each side and with transverse rows of pores, a few pores also on snout distal to the rostral groove; mouth strongly arched, lower jaw included, maxillary extending to a vertical from anterior margin of eye; rostral and maxillary barbels equal, as long

as eye; scales large, thin, and marked by numerous longitudinal striae; lateral line complete, moderately decurved; 31 scales in longitudinal series, 5.5–1–4.5 in transverse series, 2.5 rows between base of ventrals and lateral line, 11 between dorsal fin and nape, 14 around narrowest part of caudal peduncle.

Fins: Dorsal origin over base of ventrals, rather nearer to snout than to base of caudal; dorsal rays iii,8; the last simple ray stout, with strong serrations, its length with soft tip 1.5 in depth of body and equal to distance from anterior nostril to posterior border of head, its osseous part equal to head less snout; dorsal margin slightly incised; caudal forked, somewhat longer than head; anal rays iii,5, the unbranched rays weak, longest ray equal to third simple dorsal ray, margin of fin truncate; ventrals and pectorals subequal, 1.25 in head, ventrals with a long axillary scale at base.

Color: Above dull greenish, sides and below silvery, with faint dark longitudinal lines on back and sides following rows of scales; a dark area on posterior part of caudal peduncle; margin of dorsal and caudal dusky, other fins plain.

Type.—A specimen 10.5 cm. long taken at Pliew waterfall on Kao Sabap, near Chantabun, Southeastern Siam, April 9, 1925. Cat. No. 90297, U.S.N.M.

Remarks.—This species is as yet represented by only the type, which was collected by Luang Masya Chitrkarn, of the Siamese Department of Fisheries. The fish appears to be known to local fishermen and is called *pla kaow.*

I take pleasure in naming this species after Mr. J. R. Norman, in charge of the collection of fishes in the British Museum.

BARILIUS KORATENSIS, new species

Description.—Moderately elongate, body and head greatly compressed; predorsal profile very slightly elevated, with a minor concavity at nape and a minor convexity on back; depth 3.5 in standard length; least depth of caudal peduncle less than 0.5 head; eye 3.5 in head, 1 in snout, 1 in interorbital space; mouth small, oblique, jaws about equal, maxillary extending to a point under anterior edge of eye; no barbels; lateral line decurved, running in lower half of caudal peduncle; scales in lateral series 34, in transverse series 7 above lateral line, 4.5 below lateral line, 2 between lateral line and base of ventral, 17 before dorsal, 12 around caudal peduncle; scales along middle of side marked by 10 to 12 parallel striae.

Fins: Dorsal rays ii,7, longest branched ray 1.5 in head and more than 0.5 depth of body; origin of dorsal far in advance of anal, midway between base of caudal and anterior fourth of eye, over fourteenth scale of lateral line; caudal longer than head,

deeply forked, lobes pointed; anal rays iii,10, longest less than those of dorsal, and origin under last dorsal ray and under nineteenth scale of lateral line, anal base equal to head less snout; ventrals short, inserted half way between pectorals and anal; pectorals not reaching ventrals, 1.2 in head.

Color: Back pale green, sides and belly silvery; a brownish spot over eye; two narrow black vertical stripes on side, one above pectoral, one below dorsal; fins plain.

Type.—A specimen 6.0 cm. long collected in November, 1926, in the Mun River at Tachang, District of Korat, Eastern Siam, by Phra Anuwati, district forest officer. Cat. No. 90298, U.S.N.M.

Remarks.—Although only a single specimen of this little fish is at hand, it is said by the collector to be common, going in large schools. This species is principally characterized by the joint fea-

FIGURE 7.—BARILIUS KORATENSIS

tures of absence of barbels, comparatively large scales, insertion of dorsal fin almost entirely in advance of anal, and greatly reduced number of vertical stripes on the sides.

BARILIUS PULCHELLUS, new species

Description.—Moderately elongate, strongly compressed; ventral profile rather more curved than dorsal; depth 3.4 in standard length; caudal peduncle rather slender, its least depth 0.5 length; head 4 in length; eye 3.3 in head, 1 in snout, 1 in flat interorbital space; circumorbital bones large, the third as wide as eye; mouth very oblique, maxillary extending to a point under anterior part of orbit, lower jaw slightly projecting; 3 rows of large, deep pores covering the entire length of the lower jaw, similar pores on snout and under anterior part of eye; a pair of rostral barbels as long as eye, and a pair of minute maxillary barbels; lateral line rather strongly decurved, running in lower part of caudal peduncle, 38 scales in lateral

series, 7 rows above lateral line, 5.5 rows below lateral line, 3 rows between lateral line and base of ventrals, 22 scales before dorsal, 14 scales around narrowest part of caudal peduncle; scales of back and upper side conspicuously ridged and with fluted edge.

Fins: Dorsal rays ii,8, longest 1.75 times in head; margin of fin convex, its origin over eighteenth scale of lateral line, midway between base of caudal and posterior edge of eye, first branched ray in advance of origin of anal, base of last ray over middle of anal; caudal longer than head, deeply forked, lobes pointed; anal rays iii,11, longest less than first dorsal rays, margin of fin slightly convex; ventrals inserted under eleventh scale of lateral line, shorter than pectorals; pectorals reaching to base of ventrals, the first rays longer than those of dorsal.

Life colors: Back pale sap green, sides and belly bright silvery, belly between pectorals and ventrals orange; side marked by 10 blackish vertically elongate spots, the first at the nape, the spots

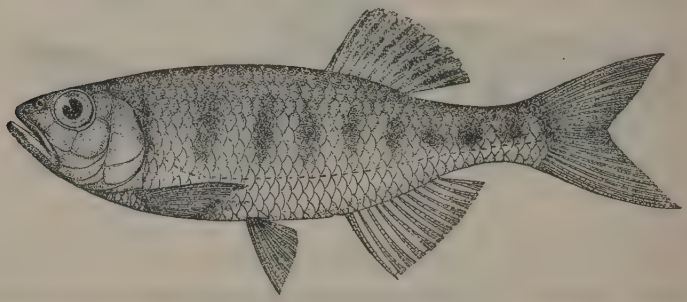

FIGURE 8.—BARILIUS PULCHELLUS

becoming roundish on the caudal peduncle; top of head like back, side of head bright silvery; top of snout, muzzle, and margin of upper lip black; iris yellow; dorsal fin orange, with outer two-thirds of membranes jet black; caudal pale green, with dusky edges; anal, ventrals, and pectorals bright orange.

Type.—A specimen 7.0 cm. long over all taken on December 1, 1928, in the Mekang at Pang Chao, Northern Siam. Cat. No. 90299, U.S.N.M.

Remarks.—This species is as yet known only from 4 specimens taken with a cast net in the Mekang, a beautiful clear, cool, mountain stream on Doi Angka, Northern Siam. The 3 cotypes are similar to the type but show slight variation in the shape and position of lateral spots. The fish is known to the local people, who call it *pla nam muk* (ink fish) and say that it reaches no larger size than these specimens exhibit; one of them contained well-developed ova.

The nearest relative of this species is *B. vagra*, known from India and Ceylon; that, however, is a more elongate species (depth 5 in length instead of 3.4), with rather smaller scales, longer rostral barbel, and only the last two dorsal rays inserted above the anal, whereas in *B. pulchellus* the entire dorsal is above the anal with the exception of the first three rays. In life the species is conspicuous for the jet black areas on the interradial membranes of the dorsal and the orange-colored lower fins.

The genus *Barilius* has many representatives in India, but only three have previously been recorded from Siam, namely, *B. guttatus*, *B. harmandi*, and *B. ornatus*, the last described by Sauvage from the Menam Chao Phya. Others may be expected from mountain streams near the Burmese frontier.

GARRA TAENIATA, new species

Description.—Elongate, slightly compressed, depth slightly less than 5 times in standard length; caudal peduncle long, its depth 0.5 its length; head equal to depth of body; eye 5 in head, 2.5 in snout, 2 in flat interorbital space; snout bluntly pointed, with a marked transverse depression or groove posterior to its tip, the depression sending a shallow branch groove to each nostril and a downward branch which extends to the upper postlabial groove; upper surface of snout as far as eyes thickly beset with sharp horny tubercles, of which one on either side of the tip of the snout is much enlarged; top of head minutely papillate; anterior surface of snout smooth; mouth transverse, twice width of eye; upper lip broad, covered with small, round, soft papillae which are arranged in numerous distinct groups corresponding with the crenululated free margin of the lip; lower lip thickly beset with small, round, fleshy papillae, the suctorial disk larger than eye, its antero-posterior diameter 0.75 its transverse; rostral barbels longer than eye, maxillary barbels vestigial; lateral line straight, scales in lateral series 35, in transverse series 4.5–1–4.5, in predorsal region 10, between lateral line and base of ventrals 3, around narrowest part of caudal peduncle 12.

Fins: Dorsal rays ii,8; origin of dorsal well in advance of ventrals and midway between tip of snout and posterior end of anal base; free margin of dorsal deeply incised, longest rays longer than head; caudal longer than head, deeply forked; anal rays ii,5, longest less than head; ventrals shorter than pectorals and about length of head.

Color: Back and head parrot green, a broad black band wider than eye from head to base of caudal, a narrow silvery band above it; under parts white; dorsal fin with a medium creamy-yellow band, the basal and distal parts blackish; caudal dusky green; other fins pale apple green.

Type.—A specimen 12.8 cm. long taken near the headwaters of Tadi Stream, in Ban Kiriwong, Province of Nakon Sritamarat, Peninsular Siam, July 10, 1928. Cat. No. 90300, U.S.N.M. Paratype No. 90301.

Remarks.—This species has been compared with the known forms of *Garra* from India and Burma as represented in the extensive collections in the Indian Museum, Calcutta, and found to be quite different therefrom. The pattern of coloration is especially characteristic.

No species of *Garra* has heretofore been reported from Siam. This fish is not rare in mountain streams in the western part of the Province of Nakon Sritamarat and may be looked for in other mountainous regions of the peninsula. The maximum size attained appears to be about 15 cm. The local Siamese name for the fish in the type locality is *pla lia hin* (stone-lapping fish). All of the fins have the interradial dermal flanges which are seen in other mountain-stream fishes of India, Burma, and Siam; their significance has not been determined.

EPALZEORHYNCHUS SIAMENSIS, new species

Description.—Elongate, slightly compressed, greatest depth of body 4.6 in standard length; least depth of caudal peduncle 1.5 in its length and 0.5 depth of body; head small, conical, its length 4.75 in length without caudal; eye 4.25 in head, 2 in snout, 2 in convex interorbital space; a pair of rostral barbels about 0.5 eye, no maxillary barbels; upper lip long, deeply fringed with 15 well-marked sections; lower lip with a few short papillae; scales in lateral line 35, in transverse series 5.5–1–5.5, all scales marked by numerous fine parallel horizontal lines; snout, top of head, and upper lip thickly covered with minute low papillae.

Fins: Dorsal fin in anterior half of total length, over ventrals, dorsal rays iii,8, the longest ray exceeding depth of body; basal part of dorsal rays with fleshy flanges; caudal fin much longer than longest dorsal rays, deeply forked, lobes pointed; anal origin midway between ventrals and base of caudal, rays ii,5, longest branched ray equal to depth of body over anal fin; ventrals and pectorals short, subequal.

Color (in life): Back and sides green with flecks of light blue or purple; top of head bright green; a black lateral band as wide as eye from head to base of caudal, continued to tip of middle caudal rays; a narrow, silvery lateral band below the black band; under parts white; dorsal, caudal, and pectorals very pale green; anal and ventrals hyaline.

Type.—A specimen 13.8 cm. long caught July 14, 1928, in a dip net in the upper part of Tadi Stream, a mountain rivulet flowing

eastward into the Gulf of Siam through the town of Nakon Sritamarat, Peninsular Siam. Cat. No. 90302, U.S.N.M.

Remarks.—This genus has heretofore been known from a single species, *E. kalopterus* (Bleeker), found in rivers in Sumatra and Borneo where Bleeker reported it to be not rare. It is characterized, among other features, by having two pairs of barbels whose length is about equal to diameter of eye, and by having on the dorsal and anal fins a broad black band, and on the ventrals a large black area which may involve the entire fin. Its maximum length is 16 cm.

The Siamese fish presents such differences from the East Indian form that it seems best to describe it and give it a name. The two are similar in general shape, in squamation, in fin formulae, and in having a broad dark band extending from the snout to the tip of the middle caudal rays; but the Siamese form has no vestige of maxillary

FIGURE 9.—EPALZEORHYNCHUS SIAMENSIS

barbels, there are fewer scales in transverse series, and the dorsal, anal, and ventral fins have no black whatever.

The absence of maxillary barbels requires a modification of the definition of this genus.

Although only a single specimen was obtained in the upper waters of Tadi Stream, the fish is apparently known to the fishermen, who report that it reaches no larger size than the type and is good to eat. A name borne by no other fish is applied to it, *pla lab mue nang* (lady's finger-nail fish).

SCAPHOGNATHUS, new genus

Body deep, strongly compressed, abdomen rounded; snout partly covering upper lip and with a small lateral groove; mouth small, terminal, the lips continuous around corners of mouth; lower lip confined to the sides, the median portion of the lower jaw being a slender, sharp-edged, scoop-like process overhung by the upper lip

when mouth is closed; no barbels; branchial membranes broadly united to isthmus, branchial apertures not reaching to below preopercle; scales large, lateral line complete; all fins well developed; dorsal fin long, last simple ray osseous, stout, denticulated, branched rays numerous; last simple anal ray osseous, stout, branched rays 6.

This genus presents a combination of characters which serve to distinguished it readily. The outstanding features are the very deep and compressed body; the highly modified lower jaw with the lips restricted to the sides and the central part forming a strong, slender, sharp-edged scoop; the strong, osseous, denticulated last simple ray in the dorsal fin; the numerous branched dorsal rays; and the presence of a strong, osseous, untoothed simple ray in the anal fin.

In some members of the Bleekerian genus *Sarcocheilichthys* from eastern Asia, the lower jaw is somewhat similar to that in *Scaphognathus*, but the median lipless part is much less developed and not scoop-like, and the mouth is inferior; moreover, the last simple dorsal ray is not strongly osseous and not denticulated.

SCAPHOGNATHUS STEJNEGERI, new species

Description.—Body ovate, strongly compressed, depth 2 in standard length; greatest width of body about 0.25 depth and equal to snout and eye; dorsal profile strongly arched, a slight concavity at nape; back anterior to dorsal fin compressed to a moderately sharp ridge; head short, compressed, bluntly pointed, 4.35 in length, its depth somewhat less than length; snout short, a vertical groove on each side, a few inconspicuous pores on lateral part in line with lower edge of orbit; eye large, prominent, inclined outward and downward, less than snout, 3.5 in head, 1.8 in convex interorbital space, a free orbital rim; mouth terminal, maxillary not reaching vertical from anterior margin of eye, gape narrow, upper lip partly covered by snout and separated therefrom by a deep fold continued around the corners of mouth and coterminous with lower lip; lips rather thin, continuous, lower lip on each side occupying one-third the width of jaw and deficient medianly; a long, slender, bony, sharp-edged, scoop-like process occupying the middle of lower jaw, its width much less than that of mouth, its length two-thirds diameter of eye; no barbels; caudal peduncle short, broad, its least depth less than its length and equal to snout and eye; lateral line gently decurved, running in middle of caudal peduncle; scales thin, smaller on caudal peduncle and thorax, 28 or 29 in lateral series, 6.5–1–4.5 in transverse series, 3.5 rows between lateral line and base of ventrals, 12 in predorsal region, and 16 around narrowest part of cadual peduncle; a deep scaly sheath at base of anal.

Fins: Dorsal formula iv,14; origin of dorsal over ninth and tenth scales of lateral line, slightly posterior to that of ventrals, and midway between tip of snout and base of middle caudal rays; dorsal emarginate, the branched rays becoming gradually shorter, last ray slightly produced, shortest ray one-third length of first; fourth simple dorsal ray denticulated, very stout and strong, its length with soft tip 1.6 in depth of body; length of dorsal base 1.6 times head; caudal fin broad, forked, lobes pointed, length of fin nearly equal to dorsal base; origin of anal under seventeenth scale of lateral line, anal rays iii,6, third simple ray osseous, strong, its length less than that of similar dorsal ray, border of fin rather deeply emarginate, the last ray 0.4 length of first branched ral; ventrals extending beyond vent, equal to pectorals and somewhat shorter than head.

FIGURE 10.—UNDER SIDE OF HEAD OF SCAPHOGNATHUS STEJNEGERI

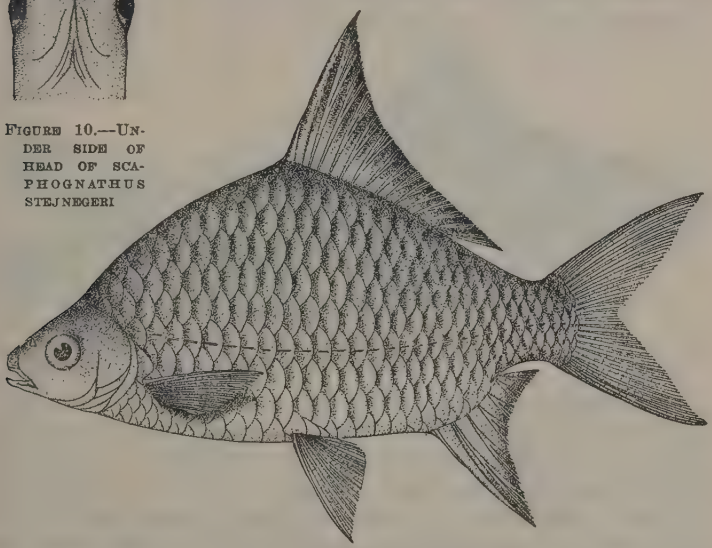

FIGURE 11.—SCAPHOGNATHUS STEJNEGERI

Color: Silvery, black pale green, scales of back and sides with dark green base.

Type.—A specimen 22.5 cm. long taken in the Mekong River near Ban Mekong, Northeastern Siam, February 24, 1929. Cat. No. 90303, U.S.N.M.

Remarks.—This species is apparently rare. In extensive collecting in the Mekong where it forms the boundary between Siam and French Indo-China, only a single specimen was obtained.

Named in honor of Dr. Leonhard Stejneger, head curator of biology in the United States National Museum.

MYSTUS HAVMOLLERI, new species

Description.—Dorsal profile rather steep, sloping in a straight line from dorsal fin to rounded overhanging snout; depth 4 in standard length; caudal peduncle rather stout, its narrowest part 1.5 in its length and equal to postorbital part of head; head conical, as broad as high, its length 1.5 its breadth and equal to depth of body; skin of head smooth, a shallow median fontanelle extending from between eyes to base of slender occipital process, which reaches interspinal bone of dorsal; eye small, 5 in head, 2 in snout, nearly 2 in convex interorbital space; mouth horizontal, its width 1.5 eye; a narrow band of teeth in jaws and on palate; nasal barbels extending as far as eyes, maxillary barbels 0.6 length of head, mandibulary barbels somewhat longer than nasal, mental barbels shorter; a transverse row of 4 large pores behind lower lip; entire snout thickly beset with minute pores.

FIGURE 12.—MYSTUS HAVMOLLERI

Fins: Dorsal rays i,7; margin of fin convex; origin of fin midway between tip of snout and origin of anal; dorsal spine short, stout, without teeth, its length less than half depth of body and equal to postorbital part of head; adipose fin separated from dorsal by a space equal to eye, its height 0.5 that of caudal peduncle, its length about 2 times dorsal base; caudal broad, deeply forked, the lobes broadly rounded and somewhat shorter than head; anal rays iii,10, entirely under adipose, margin rounded, rays longer than longest dorsal rays; ventrals short, inserted under two last dorsal rays; pectorals longer than but not reaching ventrals, the stout spine longer than dorsal spine and strongly denticulated on posterior edge.

Color: General color light yellowish-brown; body and head marked by 7 irregular dark brown cross-bands: (1) from top of head, through eye, across cheek, (2) from nape obliquely to lower part of opercle, (3) from back in front of dorsal fin obliquely downward and backward nearly to ventral base, (4) broad-based, triangular, from back

under posterior part of dorsal and anterior end of adipose to below lateral line, (5) similar, from anterior half of adipose nearly to anal base, (6) narrow, vertical, across caudal peduncle at posterior end of adipose, and (7) across base of peduncle, the first, third, fifth, and seventh bands most distinct; dorsal fin with a dark brown base and a broad band on distal part extending its entire length and leaving a clear narrow margin; fins otherwise plain.

Type and paratypes.—The type is 5.2 cm. long, collected in January, 1927, in Klong Thalerng, near Ronpibun, Peninsular Siam. The paratypes number 6, and range in length from 4.1 to 5.2 cm. Cat. No. 90304, U.S.N.M.; paratypes, 90305.

Remarks.—This strikingly marked little fish is known only from the type locality.

This species is named for Mr. R. Havmöller, who collected the type and cotypes, and has presented numerous other interesting specimens to the Siamese Department of Fisheries and the United States National Museum.

PANGASIUS CULTRATUS, new species

Description.—Elongate, body greatly compressed and deep, ventral profile much more arched than dorsal, dorsal profile from snout to dorsal fin slightly elevated and nearly straight; abdomen compressed to a sharp edge along entire median line; depth of body at anal origin 3.6 in standard length, the thickness 3.25 in depth, least depth of peduncle about equal to postorbital part of head; head short, 5 in body length, moderately compressed, its greatest width 1.5 in length and about equal to its depth; snout short, blunt, broadly rounded, slightly less than eye; eye large, 3.5 in head, rather more than 2 in the strongly convex superior interorbital space and less than 2 in the inferior interorbital space; eye scarcely visible from above, its middle behind corner of mouth, its anterior margin separted from mouth by a space equal to 0.5 eye; mouth subterminal, crescentic, its width 1.5 times eye; teeth in jaws in a narrow band, on vomer in well-separated horizontally ovate patches, on palatines in smaller oblique patches which form a crescent with those on vomer; maxillary barbels, attached behind corner of mouth, occupy a deep groove, extend slightly behind eye, and are much less than 0.5 head; mandibulary barbels less than 0.5 maxillary barbels; skin of head minutely granular, no obvious median fontanel; occipital process long and slender.

Fins: Dorsal formula ii,6, the spine equal to head minus snout, slender, laterally compressed, finely serrated on posterior edge, longest soft rays 2.5 times length of dorsal base; adipose fin small, slender, less than diameter of eye, its insertion over last fifth of anal fin; caudal broad, forked, somewhat longer than head, the lobes obtusely pointed; anal rays iv,39, the long base of fin con-

tained 2.8 times in standard length; ventrals small, shorter than pectorals, inserted well above the median line; pectorals about equal to dorsal, the spine slender and finely serrated on posterior edge.

Color: Back and top of head rich grass green; sides and under parts white; from the green color of the anterior back a tapering green band extends backwards along lateral line for about half length of body, and below this a shorter, broader green band extends backwards and downwards; fins mostly hyaline, caudal green at base, anal pinkish.

Type.—A specimen 26.0 cm. long over all, 22.5 cm. to base of caudal, taken in a cast net in the Tapi River near Bandon, Peninsular Siam, September 30, 1923. Cat. No. 90306, U.S.N.M.; paratype, 90307.

Additional specimens.—Four other specimens are referred to this species: Two 14.5 and 15.5 cm. long caught in a cast net in the Sikuk River, Central Siam, November 16, 1923, another 17.0 cm. long taken in a seine in the Menam Chao Phya at Bang Sai, November 17, 1923, and a fourth 18 cm. long, in the Menam Chao Phya at Bang Sai, September 12, 1924.

Remarks.—From related species this form may be distinguished by its greatly compressed form, cultrate abdomen, large eye, short maxillary barbel, four patches of teeth on vomer and palatines, and very long anal with more numerous rays than in any other known species. The most closely related species appears to be *P. micronema* Bleeker, from Java, Sumatra, and Borneo, in which the depth is less, the eye is smaller, the anal base is much shorter, and the anal rays are iv,25 to iv,30. In *P. pangasius* (Buchanan), known from India and Burma, and also Siam, the form is comparatively slender (depth 4.6 to 5 in length), the maxillary barbels may reach the pectorals, and the anal rays number only iv,26 to iv,29.

This fish is known as *pla sangkawad* at Bandon. This name, with or without qualifying adjectives, is applied in various parts of Siam to other members of the genus. The additional specimens, from the Chao Phya and Sikuk rivers, are also locally called *pla sangkawad.*

PANGASIUS BEANI, new species

Description.—Form rather stout, the body compressed and deep, the head depressed and very broad; profile before dorsal fin straight and markedly elevated, forming an angle of 30° with horizontal axis of body; depth of body under dorsal spine 3.5 in standard length, over origin of anal 4.3 in length; caudal peduncle short, its least depth less than 2 in its length; head 3.5 in standard length, its width 0.75 its length and more than its depth; upper surface of head rugose, a shallow median groove extending from snout to base of

occipital process whose base is 0.5 its length; snout very broad, rather pointed when viewed from side, evenly rounded, slightly overhanging the horizontal mouth, whose width at corners is 4 times diameter of eye; teeth in jaws villiform, in a well curved band with a median division in each jaw; teeth on vomer in a single quadrate patch whose length is nearly 3 times its antero-posterior diameter, elongate patches of palatine teeth slightly separated from the vomerine and forming therewith a regular crescentic band; eye small, partly below the corner of the mouth, nearly 7 in head, 4.5 in the convex superior interorbital space, and 4 in the inferior interorbital space; maxillary barbel arising in a deep groove above corner of mouth and extending to opercle, its length less than 0.5 head, mandibulary barbel shorter, 2 times diameter of eye.

Fins: Dorsal formula ii,7; dorsal spine serrated on posterior edge, its length about equal to head less snout, its filamentous prolongation as long as spine; length of first branched ray 2 times base of fin; adipose fin about 2 times as high as long, its origin about over the beginning of the second half of the anal base; caudal deeply forked; anal rays iv,26, the longest branched rays more than 0.5 base of fin, which is contained 4 times in standard length; ventrals inserted far behind dorsal, shorter than pectorals, the first ray produced and reaching well beyond anal origin; pectoral spine strongly serrated on posterior edge, somewhat shorter than dorsal, the longest branched ray 1.5 head.

Color: Dark green above, white below; dorsal and caudal dusky, other fins plain, anterior anal rays with a black tip.

Type.—The type, 16.3 cm. standard length, 20.0 cm. over all, was taken November 26, 1923, in Klong Ban Poh, off Lopburi River, near Ayuthia, Central Siam. Cat. No. 90308, U.S.N.M.

Remarks.—This species is easily recognized by its extremely broad, depressed head, its comparatively short form, its small eye, its short barbels, its dentition, etc. Its nearest relative appears to be *P. pangasius* (Hamilton Buchanan), known from India, Siam, and Java. In that species, however, the body is more elongate, the head narrower, the barbels are longer (the maxillary extending to base of pectorals), the profile from snout to dorsal fin is much less steep, the anal base is comparatively longer, and the vomerine teeth form two separate patches except in full-grown specimens. In the plates of *P. pangasius* published by both Day (Fishes of India) and Bleeker (Atlas Ichthyologique), the vomerine teeth are in two distinct patches.

This species is named for Mr. Barton A. Bean, assistant curator in charge of the division of fishes in the United States National Museum.

PANGASIUS FOWLERI, new species

Description.—Moderately elongate; body rather strongly compressed, its width at origin of anal fin slightly more than one-third its depth, depth 3.75 in standard length; caudal peduncle twice as long as deep, its least depth equal to distance from eye to pectoral spine; head covered with smooth skin, short, blunt, conical, its length about 5 in standard length, its greatest width equal to its depth behind eyes; snout obtusely rounded; mouth opening subterminal, slightly angular, distance between corners 2.5 times in length of head; teeth in upper jaw in a wide, moderately curved, rather broad band, in lower jaw in a more strongly curved band, vomerine teeth in two well-separated transverse ovate patches, with the somewhat longer palatine patches perpendicular thereto; maxillary barbels less than 0.5 length of head, occupying a deep slit that extends from corner of mouth to beyond eye; mandibulary barbels about 0.5 length of maxillary; eye large, behind corner of mouth, shorter than snout, its upper margin on a line from anterior nostril to middle of caudal base, its diameter more than 3 in the strongly convex interorbital space; ventral distance between eyes less than dorsal.

Fins: Dorsal rays ii,7; height of dorsal equal to head less snout, its base 0.5 height; dorsal spine rather strong, 1.5 in head, its posterior border strongly serrated, anterior border feebly serrated at tip and granulated at base; adipose fin small, slender, equal to eye, its attachment over the beginning of the last fourth of the anal; caudal deeply emarginate, the lobes pointed; anal long, its rays iv,38, length of anal base contained less than 3 times in standard length, longest anal rays one-third head; ventrals short, less than 0.5 head, not extending to anal; pectoral rays slightly longer than dorsal, the spine equal to dorsal spine and similarly serrated but more slender.

Color: Back and top of head green; sides and belly white; a lateral green band broadest at shoulder, and a broad oblique green band from shoulder to a point on side above end of ventrals; dorsal and caudal fins with dusky margin, other fins plain.

Type.—A specimen 17.0 cm. to base of caudal, 19.5 cm. over all, taken in the Lopburi River at Lopburi, Central Siam, October 22, 1926. Cat. No. 90309, U.S.N.M.

Remarks.—The closest relative of this species appears to be *P. micronema* Bleeker, known from Java, Sumatra, and probably Siam. In that fish, however, the vomero-palatine teeth form a regular crescent, the band of upper jaw teeth is less curved, the anal rays number iv,24 to iv,30, the anal base is contained 3.6 to 4 times in standard length, and the coloration is different.

The fish at Lopburi shares with related forms the name *pla sawai*. The collection contains only the type specimen.

This species is named for Mr. Henry W. Fowler, of the Academy of Natural Sciences of Philadelphia, as a small tribute to his indefatigable studies of oriental fishes.

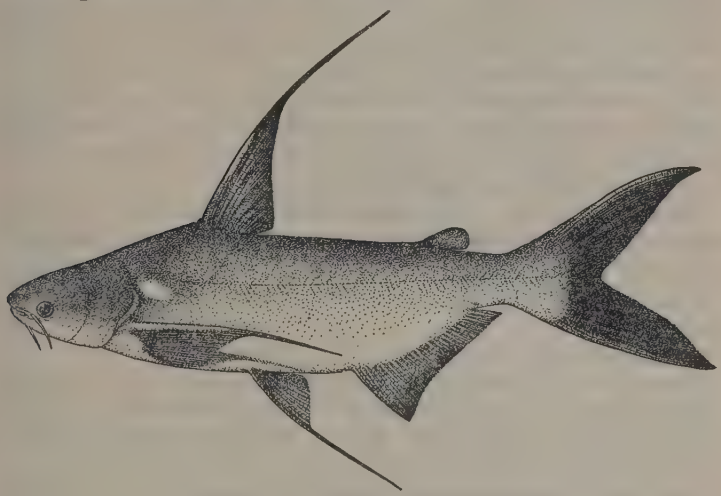

FIGURE 13.—PANGASIUS SANITWONGSEI

PANGASIUS SANITWONGSEI, new species

Description.—Elongate, body moderately compressed, head broad and depressed; dorso-rostral profile nearly straight and gently inclined; depth 3.75 in length to base of caudal; head 4.3 in length; eye placed low on side of head, small, more than 7 in head, 3 in snout; maxillary teeth in a wide, continuous curved band, vomero-palatine teeth united into a single broad strongly arched band with the outer part nearly at right angles to the central vomerine mass and tapering backward into sharp points; barbels slender and rather short, the maxillary 2.5 times diameter of eye, the mandibulary shorter; least depth of caudal peduncle 0.5 its length and contained 2.75 times in length of head.

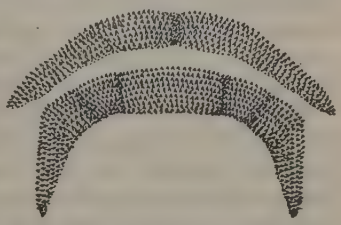

FIGURE 14.—MAXILLARY AND VOMERO-PALATINE TEETH OF PANGASIUS SANITWONGSEI

Fins: Origin of dorsal fin about midway between tip of snout and adipose fin; dorsal rays ii,7; second simple dorsal ray greatly prolonged and filamentous, 0.5 combined length of head and body, the

strong ossesous part weakly serrated on its posterior side and 0.4 total length of the ray; dorsal branched rays becoming progressively shorter, so that last ray is only 1.5 times diameter of eye and the posterior border of fin is nearly vertical; dorsal base short, 2.5 in head; adipose fin small, its length less than base of dorsal, distance between the fins 3 times length of base of dorsal; caudal large, longer than head, deeply forked, the lobes pointed; anal rays iv, 26, longest ray equal to postorbital part of head; base of fin 2.5 base of dorsal and somewhat less than 0.25 standard length; first ray of ventrals filamentous and reaching beyond middle of anal; pectoral spine similar to dorsal spine as to size and serrations, its filamentous tip as long as the spine and extending to anal.

Color: Above slaty gray, below white; a roundish, glistening white humeral spot twice diameter of eye; dorsal, adipose, and caudal fins black; ventrals and pectorals blackish; anal with dusky areas.

Type.—The type specimen in the collection of the Siamese Department of Fisheries was taken in the Menam Chao Phya at Koh Yai, Central Siam, March, 1928. It is 61.6 cm. long.

Remarks.—The principal differential characters of this species are to be seen in the united band of vomero-palatine teeth, the short barbels, the filamentous dorsal, ventral, and pectoral fins, the coloration of the fins, the white humeral spot, and the colossal size.

This fish is known along the Menam Chao Phya as *pla tepa.* This name is to be distinguished from *pla tepo*, applied to a common fish of the same genus (*Pangasius larnaudi*) which differs markedly in various respects, one striking feature being a large shiny-black humeral spot.

In point of size this fish rivals the celebrated *Pangasius* of the Mekong basin called *pla buk* by the Siamese. In former times fish 3 meters in length were sometimes taken, and at least one fish of this size has been recorded within eight years. In recent years, examples over 1.5 meters in length have been rare.

The *pla tepa* frequents the entire length of the Menam Chao Phya, but is nowhere abundant. Within a few years, fish reaching the Bangkok markets have come mostly from the section of river below Ayuthia, and the largest observed have been about 1 meter long.

Named in honor of the late Dr. Yai S. Sanitwongse, in recognition of his keen personal interest in the fishes of Siam. It was he who first brought this species to the writer's attention and pointed out its distinctive characters.

ARIUS SCIURUS, new species

Description.—Body rather stout, moderately compressed, depth slightly less than .25 length to base of caudal; least depth of caudal peduncle .5 postorbital part of head; head conical, its depth about

equal to its breadth, its length about 3.3 times in body length; rostro-dorsal profile convex, the snout strongly decurved and obtusely pointed viewed from above; cephalic shields only slightly rugose, occipital process granular, strongly keeled, subtriangular, its base somewhat less than length, the posterior end rounded; a shallow lanceolate fontanel extending from above posterior nostrils to base of occipital process; eye lateral, in anterior half of head, more than 5 in head, more than 1.5 in snout, 2.5 in postorbital region, and 2.8 in interorbital; mouth rather small, its width 2 times diameter of eye; humeral process smooth, less than eye; maxillary barbels slender, short, extending 1 eye-diameter beyond eye; mandibulary barbels reaching less than .5 distance to posterior margin of branchial membrane; mental barbels shorter; teeth in upper jaw in a medianly-constricted band about 3 times as long as broad, palatine teeth large molar-like, in 2 large suboval patches; gill-rakers short, club-like, 9 on lower arm of first arch, the longest one-third diameter of eye.

Fins: Dorsal rays i,7, height of fin greater than depth of body and equal to distance from posterior nostril to branchial aperture, base of fin much less than 0.5 its height, spine very slender, longer than head without snout, serrated distally on both anterior and posterior surfaces; base of adipose fin equal to base of soft dorsal and separated from dorsal by 2.5 times its length; caudal deeply cleft, the lobes acute, the upper lobe longer; anal rays iv,14, the longest equal to height of body at anal origin and somewhat longer than base of fin, the posterior edge emarginate; ventrals less than .5 length of head; pectorals about equal to head without snout, the slender spine less than dorsal spine and serrated on both edges.

Color: Back and sides light slaty-blue, belly silvery; fins yellow-green, dorsal with a blackish margin, anal dusky, adipose with a black spot.

Type.—A specimen 25 cm. long over all, 21 cm. to base of caudal, taken with a castnet in the Tapi River near Bandon, Peninsular Siam, September 30, 1923. The fish is a male, with the buccal and pharyngeal cavities filled with eggs in an advanced stage of development whose long diameter is 1.4 cm. and short diameter 1.2 cm. Cat. No. 90310, U.S.N.M.

Paratype.—Another specimen, 25.5 cm. long over all, 21.5 cm. to base of caudal, taken at the same place and date, is a male with five young, 4.0 cm. long, in the back of the pharynx.

Remarks.—This is a very common fish in the Tapi River where it is said to attain a length of 1.5 meters. Examples in the Bandon market on September 29, 1923, were 60 cm. long. Eggs of this fish, separately exposed for sale, had been removed from the mouth of large males in an agglutinated mass looking like a bunch of grapes.

Some of the clusters were 18 cm. long, and the eggs were nearly 1.5 cm. in long diameter. At an early stage of incubation the eggs are coherent, but some time before hatching they become entirely separate. The palatine teeth on elevated bases project conspicuously into the cavity of the mouth, and may serve to assist in keeping the eggs in the back of the pharynx.

The nearest relative of this species appears to be *A. microcephalus* Bleeker, known only from 2 specimens from rivers of Borneo. That species, however, has a smaller head much broader than high, longer maxillary barbels, much stouter dorsal and pectoral spines, etc.

The conical head, large eye, and pointed snout suggest a squirrel, and the specific name has been applied in allusion to this resemblance.

SYNAPTURA AENEA, new species

Description.—Broadly ovate; depth of body 1.8 in standard length, 2.12 in length with caudal; head broad, evenly rounded in front, its length 3.8 in standard length, 4.6 in length with caudal; mouth

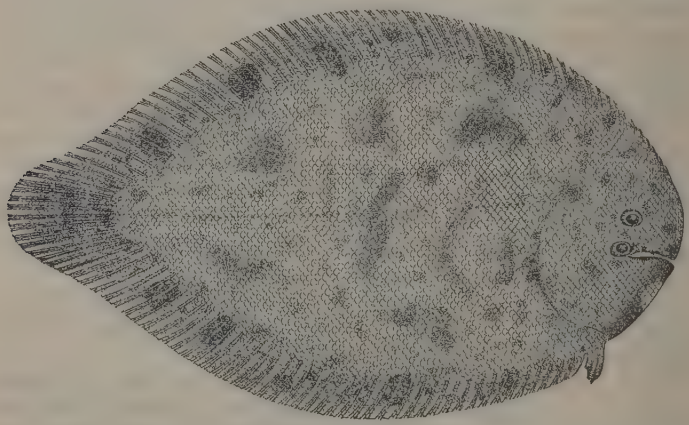

FIGURE 15.—SYNAPTURA AENEA

slightly curved, rictus about one-third length of head, angle extending below anterior port of lower eye; two small tubular nostrils in advance of lower eye; nostril on under side dilated and having a flap; lips on upper side sparsely, on lower side markedly, fringed, and nostril on under side surrounded by long fringe; upper eye slightly anterior to lower, 2 in snout, 6 in head, and greater than interorbital space; teeth very minute; lateral line straight on both sides of body; scales small, strongly ctenoid on dextral side, less so on sinistral side, 66 in lateral line, about 32 rows above and 35 rows below lateral line at widest part of body; rays in vertical fins 115,

dorsal having 54, anal 45, and caudal 16, median caudal rays longer than head without snout and longer than longest dorsal and anal rays; ventral rays 4; dorsal rays not extending on snout; pectoral on each side rudimentary.

Color: Upper side light brown, with numerous spots of darker brown of irregular side and shape on body and head; anterior margin of head between mouth and gill opening blackish, with a well defined rounded white spot on chin; vertical fins, in addition to having small, irregular dark brown spots, marked by 4 large roundish well-defined blackish spots on proximal part of both dorsal and ventral fins, these spots more than twice diameter of eye; under side of body rich reddish-brown, becoming less intense toward head which is white except for a dark area about mouth and on chin below white spot on dextral side.

Type.—A specimen 9.4 cm. long taken in the Lopburi River at Lopburi, Central Siam, October 22, 1926. Cat. No. 90311, U.S.N.M.

Remarks.—This species is not rare at Lopburi but as yet is known only from that locality. The maximum size attained is but little if any larger than the type. In a second specimen, 8.4 cm. long taken at the same time and place as the type, the brown markings have a tendency to form vermiculations, and the bronze color of the left side stops some distance behind the head, leaving more than half of under surface white. In the reduction of the pectorals to mere rudiments, this species shows a transition from *Synaptura* to *Achiroides* in which latter genus the pectorals are entirely absent.

GOBIELLA, new genus

Similar to *Mistichthys* H. M. Smith, known only from a mountain lake in Luzon, Philippine Islands, but with the first dorsal fin containing five spines instead of three. Size minute; body elongate, strongly compressed posteriorly; mouth moderate, oblique; teeth in bands; body posteriorly covered with large ctenoid scales, head and anterior part of body scaleless; dorsal fins well separated, the anterior with five short spines, the posterior dorsal and the anal fins elevated and with moderate number of rays.

GOBIELLA PELLUCIDA, new species

Description.—Elongate, head and anterior part of body very slightly compressed, posterior part of body much compressed; depth under first dorsal fin equal to head less snout and contained 3.8 times in standard length; head comparatively large, 3.3 in length; eye in anterior half of head, large, 4 in head and much greater than the blunt snout; mouth very oblique, maxillary extending to a point

under pupil; minute teeth in bands in each jaw; caudal peduncle long and slender, its least depth 3 in its length; scales large, weakly ctenoid, absent from head and from body anterior to first dorsal, 8 rows of scales in transverse series below origin of second dorsal, 9 scales around narrowest part of caudal peduncle.

Fins: Dorsal fins widely separated, the interspace greater than length of base of first dorsal; dorsal rays V–I,8; spinous dorsal low, the spines close together, the first spine longest and about equal to snout and eye, the other spines progressively shorter, the last 0.75 eye; second dorsal much elevated, its origin nearer to base of caudal than to eye, the first ray equal to postorbital part of head, the first branched ray longer than spine and equal to body depth at dorsal origin, the rays becoming gradually shorter, the last ray as long as the last dorsal spine; caudal broad, its posterior edge straight and vertical, the length along axis of body equal to height of second

FIGURE 16.—GOBIELLA PELLUCIDA

dorsal and greater than postorbital part of head; anal rays I,11, the fin similar to second dorsal, but the rays slightly shorter and base slightly longer and its origin posterior to that of second dorsal; ventrals 2 in head, forming a deep cup; pectorals broad, bluntly pointed, their length equal to longest anal ray, their tip reaching to a point halfway between the dorsal fins.

Color: White, translucent; a few irregularly disposed small round black spots on sides and abdomen; a row of minute black spots at base of anal; fins hyaline.

Types.—Numerous specimens taken on May 9, 1929, in Bangkok, Central Siam. Cat. No. 90312, U.S.N.M.

Remarks.—This diminutive goby has as yet been found only in Bangkok, but may doubtless be looked for anywhere in lower Central Siam. Its only known habitat is a small canal or ditch and a small pond in the grounds of the Department of Fisheries; the pond and canal are ultimately connected with the Menam Chao Phya. The

fish is abundant, but owing to its small size and translucency is easily overlooked.

Collections made from January to May contain egg-bearing females, and it appears that the egg-laying period is protracted and may extend over most of the year. An ovigerous female 2.1 cm. long taken February 10, 1928, contained 238 eggs with an average diameter of .64 mm.

The sexes may be readily distinguished by the shape of the genital papilla: short, broad, and truncate in the female, long, slender, and pointed in the male, as in *Mistichthys* and various other gobies. The eggs are clearly visible through the transparent abdominal walls. If there is a difference in the average size of the male and female fish it is not marked. Thus, of 16 specimens collected January 19, 1929, 13 were females ranging from 18 to 21 mm. in total length, with an average of 19.8 mm., and 3 were males ranging from 18 to 21 mm., with an average of 20 mm. The numerical disproportion of the sexes is shown from other collections, as, for example, on May 9, 1929, when, of 40 examples taken at random in a fine-mesh basket, 30 were females.

THAIGOBIELLA, new genus

Size minute; body moderately elongate; mouth large, lips thin, tongue emarginate; teeth pluriserial; eye large and placed high on head; two dorsal fins well separated, the first with 5 spines, the second with 8 branched rays; anal similar to second dorsal; ventrals not adnate to abdomen, and united for their entire length, forming a deep cup; pectorals without silky, free upper rays; body completely covered with large scales, opercles scaled, cheeks and other parts of head naked.

This genus most closely resembles *Vaimosa* Jordan and Seale the members of which inhabit brooks in the South Sea islands and Philippines. It differs therefrom in the reduced number of dorsal and anal rays, in the character of teeth and scales, in the size of head, etc.

(*Thaigobiella*, from Thai, the ancient name of the Siamese race, and *gobiella*, little goby).

THAIGOBIELLA SUA, new species

Description.—Form oblong, moderately compressed; dorsal and ventral profiles nearly horizontal, the profile of snout steep; depth 4.4 in length; caudal peduncle very broad, two-thirds depth of body and 2.25 times in head; head long, 3 in length; mouth large, very oblique, extending to a point under anterior margin of pupil, lips thin; teeth long, slender, prominent, in a band in each jaw with a few enlarged teeth interspersed; eye placed high, 3 in postorbital part of head, about equal to snout and to interorbital space; scales,

large, strongly ctenoid, smaller on anterior part of body, opercles scaled, cheeks and nape naked; 26 scales in lateral line, 11 in transverse series below second dorsal, 12 around caudal peduncle.

Fins: Dorsal rays V–I,8; dorsal spines slender, the third longest, more than 0.5 depth of body, and equal to base of fin; second dorsal separated from first by a space equal to diameter of eye, longest rays equal to depth of caudal peduncle; caudal short, broad, bluntly pointed; anal under second dorsal and similar thereto, the rays I,8; ventrals long, longer than pectorals and equal to postorbital part of head; pectorals short, broad, 0.5 head, extending to a point under last membrane of spinuous dorsal.

Life color: General color, pale creamy yellow; body with 4 irregular black crossbands, the first under the first dorsal and as wide as its base, extending nearly to median line below; the second narrower,

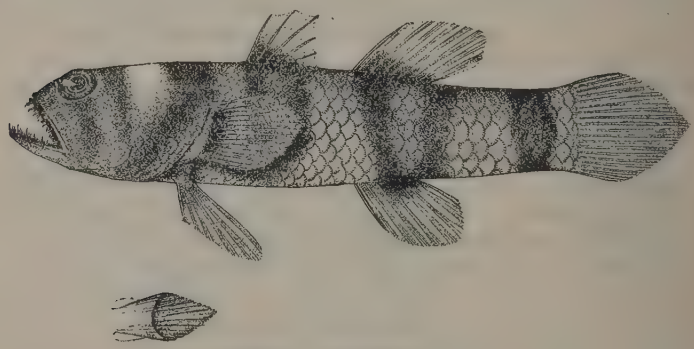

FIGURE 17.—THAIGOBIELLA SUA

extending from anterior half of base of second dorsal obliquely downward and backward to posterior part of anal; the third narrow and extending vertically posterior to second dorsal and anal; the fourth, the most intense, running vertically across posterior part of caudal peduncle at a distance of half its width from caudal fin; a blackish band across nape and posterior part of head, another extending downward from median line of head posterior to eye, and another under eye; top of head between nuchal and postorbital bands glistening white; margins of lips and orbits black; base of pectorals with a very sharply defined black vertical blotch; base of dorsal and anal fins black, fins otherwise hyaline.

Type.—A specimen 2.7 cm. long from a canal in Bangkok, Central Siam, August 26, 1924. Cat. No. 90315, U.S.N.M.

(*Sua*, the Siamese name for the tiger.)

Remarks.—This attractive but diminutive goby is as yet known from a single specimen. It was kept alive in a small glass jar for

six weeks. It usually remained either in the bottom well concealed among particles of sticky mud, or beneath the roots of a small natant water plant.

POGONOGOBIUS, new genus

Body compressed; head greatly depressed, broad and flat, with small eyes widely separated; mouth large, nearly horizontal, lower jaw slightly projecting, gape extending to a point under eye and jaws projecting backward almost to preopercle; small teeth, in several rows in each jaw, none canine or markedly enlarged; tip of tongue rounded; about eight short, fleshy barbels on each side of snout, one large pair on chin near median line and one pair on each side of the lower jaw in line with the tubular anterior nostrils; body covered with medium-sized ctenoid scales; predorsal region covered with smaller, crowded scales to a point half way between dorsal fin and anterior margin of eyes; opercles and cheeks naked; conspicuous papillary ridges of mucous pores on opercles, cheeks, snout, and under side of lower jaw; all fins rather small; dorsal spines 6, dorsal and anal soft rays 9 or 10.

This genus has as its only known representative the species described from Bombay by Day under the name of *Gobius planifrons*.[4] Day's description makes no mention of the barbels on lower jaw, but his figure[5] shows them. This species is represented in the collection of the Siamese Department of Fisheries by 2 specimens 6.5 and 7.5 cm, long from the Menam Chao Phya at Paknam, Central Siam, June 3, 1927, and 3 specimens 6.8, 8.0, and 8.7 cm. long from the Chantabun River at Lem Sing, Southeastern Siam, July 17, 1928. Day's type was about 10 cm. long.

EUGNATHOGOBIUS, new genus

This genus is characterized by an enormous mouth, the maxillary being more than two-thirds the length of head and extending nearly to the preopercle. Associated with this feature are a moderately elongate, compressed body; broad, depressed head; broad snout; small eyes covered with skin; small teeth in several rows in each jaw; emarginate tongue; medium sized, thin ctenoid scales on body; head naked; two well-separated dorsal fins, the first with only 5 rays, the second with 7 branched rays; and anal fin with 6 branched rays.

EUGNATHOGOBIUS MICROPS, new species

Description.—Form elongate, dorsal and ventral outlines similar; body strongly compressed posteriorly, the depth 4.5 in standard length and 1.5 in head; head large, broad, and strongly depressed,

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[4] Proceedings Zoological Society of London, 1873.
[5] Fishes of India, pl. 63, fig. 9.

its length slightly less than 3 in standard length, its depth 1.7 in its length, and its breadth 1.3 times its depth; snout flat, broad, 4.5 in head; eye small, on dorsal profile, covered with skin, its diameter 2.5 in snout and 2 in the broad, flat interorbital space; mouth very large and oblique, gape wide; lower jaw slightly projecting, maxillary long, and extending to within one eye-diameter of lower angle of preopercle, its length contained 1.4 times in head; tongue broad, emarginate; teeth in 2 or 3 rows in each jaw, outer teeth in lower jaw close-set and larger; least depth of caudal peduncle 0.5 its length and 2.5 in length of head; scales thin, ctenoid, uniform in size, completely covering body, 29 in lateral series, 11 in transverse series under second dorsal, head and base of pectorals naked; opercles, cheeks, and jaws with prominent lines of pores.

Fins: Dorsal rays V–I,7; first dorsal spine somewhat shorter than second and third, contained 3.5 in length of head and more than 2 in depth of body; second dorsal elevated, separated from first dorsal

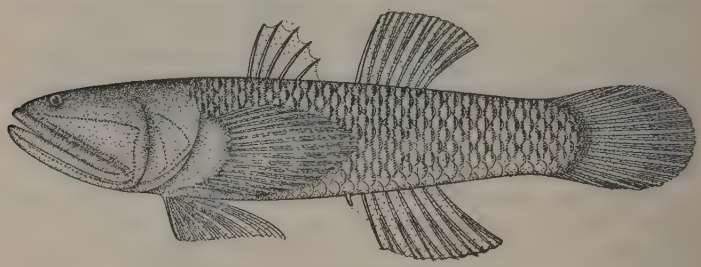

FIGURE 18.—EUGNATHOGOBIUS MICROPS

by a space nearly equal to snout, its origin slightly in advance of that of anal, the spine 2.5 in length of head; caudal rounded, the central rays equal to depth of body at origin of second dorsal; anal rays I,6, similar to second dorsal, but the spine somewhat shorter and the soft rays longer; ventrals rather large, extending two-thirds distance to anal; pectorals broad, bluntly pointed, 0.8 length of head, reaching beyond vertical from spine of second dorsal.

Color: Pale brownish-yellow; body with numerous dark brown narrow, vertical lines corresponding with the posterior margin of scales in transverse series; fins plain.

Type.—A specimen 33 mm. long over all, 28 mm. to base of caudal, from the lower Bangpakong River, Central Siam, July 1, 1923. Cat. No. 90316, U.S.N.M.

Remarks.—This striking species is known from a single specimen obtained from a pongpang net in the swift, tidal part of the Bangpakong River, where small gobies abound in both species and individuals.

PIPIDONIA, new genus

Form very elongate; body strongly compressed; head long, depressed, and broad; eyes small, close together; mouth small; teeth small, pluriserial in both jaws; scales cycloid, of moderate size, regularly arranged, head entirely naked; two well-separated dorsal fins, the anterior with five spines.

This genus may readily be distinguished by the greatly elongated body; the broad, depressed head; the widely separated dorsal fins, with only five spines in the first dorsal fin and relatively few rays in the second dorsal and anal fins; the squamation of the body and the naked head; and the fine teeth in bands.

(*Pipidonia*, from Pipidon, the Siamese island where the type was collected.)

PIPIDONIA QUINQUECINCTA, new species

Description.—Body greatly elongated and markedly compressed, depth 6 in standard length and 1.7 in head; least height of caudal peduncle 2.5 in head; head long, greatly depressed and flattened

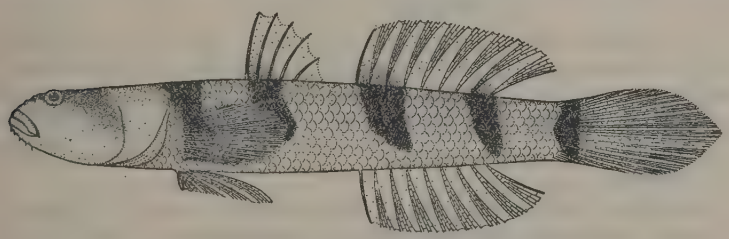

FIGURE 19.—PIPIDONIA QUINQUECINCTA

behind eyes, its greatest width nearly twice its depth and equal to postorbital region, its length 3.5 in standard length; mouth oblique, the maxillary not reaching vertical from anterior border of eye; teeth small, in about 3 rows in each jaw, outer teeth somewhat enlarged; eyes small, on dorsal profile, in anterior third of head, 0.5 length of snout and equal to the flat interorbital space; snout, rami of lower jaw, and median surface of lower jaw with numerous short fleshy filaments; body completely covered with thin cycloid scales of uniform size, 39 in longitudinal series, 10 between origins of second dorsal and anal, 7 before dorsal, and 16 surrounding narrowest part of caudal peduncle; no scales on top of head, opercles, or cheeks.

Fins: Dorsal rays V–I,8; first dorsal spine 2.25 in head and 1.8 in depth, inserted over 8th scale of lateral series; second dorsal separated from first by space equal to length of snout, the rays of nearly uniform height and equal to longest dorsal spines, the base slightly longer than that of anal and beginning slightly in advance of that fin; caudal broad, wedge-shaped, its length equal to head; anal

similar to second dorsal, the rays I,8; ventrals equal to pectorals and extending more than half distance to anal; pectorals broad, rounded, as long as postorbital part of head.

Life colors: Body and head pale yellow; five irregular reddish-brown cross-bands meeting on back and reaching more than half distance to median ventral line, one band on nape extending on base of pectoral, one band under spinous dorsal, two bands under second dorsal, and one band with a straight posterior edge extending entirely across caudal peduncle and base of caudal fin; a dusky area on top of head behind eyes, extending to preopercle; fins hyaline, the three bands under the dorsal fins extending faintly on their bases.

Type.—A speciman 2.6 cm. long, taken on Koh Pipidon, west coast of Siam, March 10, 1925. Cat. No. 90317, U.S.N.M.

Remarks.—The only known specimen of this fish was obtained in a tide-pool on the small island of Pipidon, on the west coast of Peninsular Siam, south of Puket. It is strikingly marked and is easily recognized notwithstanding its small size.

HERREA, new genus

Size minute; body elongate, compressed, scaleless; head blunt, mouth vertical; teeth in each jaw curved, in a single wide-spaced row; anterior teeth in lower jaw elongated; dorsal fins widely separated, the first dorsal with 5 spines, the second dorsal and the anal with 12 branched rays; caudal rounded; ventrals narrow, pointed, not adnate to abdomen.

Resembles *Mirogobius*, described by Herre from the Philippine Islands, in being scaleless and in having a single row of teeth in both jaws, but that genus has postsymphysial canine teeth in lower jaw and only 7 to 9 branched rays in the second dorsal, together with a reduced number of anal rays.

This genus is named for Dr. Albert W. Herre, formerly of the Philippine Bureau of Science, in appreciation of his invaluable monograph Gobies of the Philippines and the China Sea (Manila, 1927).

HERREA FORMOSA, new species

Description.—Slender, compressed, dorsal profile nearly horizontal; depth contained 6 times in length; head 4.5 in length; snout blunt, 0.5 eye; eye large, more than 3 in head and greater than interorbital space; mouth vertical, a single row of curved, wide-spaced teeth in each jaw, with longer anterior teeth in lower jaw; depth of caudal peduncle 1.5 in its length; no scales on head or body.

Fins: Dorsal rays V–I,12; first dorsal separated from second dorsal by a space 1.5 times length of first dorsal base, spines weak, third spine longest; origin of second dorsal somewhat in advance of that of anal, longest rays equal to postorbital part of head, the base 3.5 times that of first dorsal, last ray just reaching caudal; caudal

rounded, short, median rays 1.5 in head; anal similar to second dorsal, the rays I,12; ventrals equal to postorbital part of head; pectorals broad, bluntly pointed, reaching to vertical from last dorsal spine.

Color: Nearly uniform pale olive-yellow; a narrow black median dorsal stripe from tip of snout to base of caudal, extending on caudal and spreading so as to involve upper rays; a broad black lateral band extending from mouth through lower half of eye to base of caudal and thence nearly to posterior margin of caudal fin; the lateral band involves the lower jaw, and on posterior half of body is below the horizontal axis; fins pale yellow.

Type.—The only known specimen is 23 mm. long, taken in a rocky tide-pool on Koh Chula (Kite Island), off mouth of Chantabun River, Gulf of Siam, March 17, 1930. Cat No. 90324, U.S.N.M.

CREISSON SEALEI, new species

Description.—Body moderately compressed, rather elongate; back not arched but dorsal profile from behind eyes to tip of snout gently decurved; depth 4.5 in standard length, least depth of caudal peduncle 2 in head; head 3.3 in standard length, its width equal to depth; mouth wide, oblique, posterior end of maxillary reaching vertical from anterior edge of eye; tongue truncate; teeth in 4 or 5 irregular rows in anterior part of each jaw, the rows reduced in number at sides, outer row in each paw enlarged and canine-like, the largest being a backward-curving pair at side of lower jaw, some of the innermost teeth in lower jaw also enlarged; lower jaw slightly the longer, the enlarged teeth projecting in front of upper jaw when mouth is closed; cheeks tumified; anterior nostrils tubular, posterior nostrils large, open, in front of lower half of eye, with a large pore above; eyes latero-superior, inclined upward and outward, 1.5 in snout and less than 1 diameter apart; scales on body large, ctenoid, about 40 in lateral series, 13 in transverse series between origin of second dorsal and anal, 10 around narrowest part of caudal peduncle; scales before dorsal about 34, small, cycloid, extending to a point slightly in advance of posterior border of eyes; a compact patch of small scales on upper border of opercle and cheek, and a few scattered scales on upper half of cheek as far forward as eye; interorbital space and snout naked; base of pectorals and caudal thickly scaled; a large anal papilla.

Fins: Dorsal formula VI–I,10; spines in first dorsal long, slender, the tips of the third to sixth reaching second dorsal when depressed; second dorsal separated from first dorsal by a space equal to diameter of eye, the rays long, the posterior ones longest and reaching base of caudal when depressed; anal rays I,9, similar to second dorsal; caudal broad, rounded, its length greater than head less snout; ventrals broad, as long as postorbital part of head, the frenum

.25 length of fin; pectorals longer than ventrals and extending beyond their tips but not reaching anal papilla.

Color (in alcohol): Back and sides light greenish with vague darker green areas, many scales with pearly bluish spots; under side whitish; head dusky; dorsal, caudal, and anal membranes dusky bluish; ventrals distinctly bluish, with narrow white edge; pectorals dusky.

Type.—A specimen 15 cm. long including caudal fin, taken in the Menam Chao Phya at Paknam, Central Siam, May 30, 1930. Cat. No. 90318, U.S.N.M.

Remarks.—This species, as yet known from a single specimen, appears to possess all those characters assigned to the genus *Creisson* by Jordan and Seale [6] and by Herre [7] that is, fully squamate body with the anterior scales smaller; scaleless interorbital; small scales on upper part of opercle and cheek; 6 elongate spines in first dorsal and 10 elongate soft rays in second dorsal; teeth in a number of rows in each jaw, with the anterior row enlarged and one or two lateral backward-curving canines in lower jaw.

The only species of this genus heretofore known, *G. validus* Jordan and Seale, inhabits the Philippines. In that species, however, there are 29 to 32 scales in longitudinal series, 10 or 11 scales in transverse series, and about 17 scales before the first dorsal; the body is deeper and the dorsal profile strongly arched; the anal rays are I,7 or I,8; and the coloration is markedly different as regards dorsal and caudal fins, although the general color of body is similar in the two forms.

The species is named for Mr. Alvin Seale, coauthor of the genus, in slight recognition of his valuable contributions to the ichthyology of the eastern Pacific.

PARAGOBIODON KERRI, new species

Description.—Form comparatively short and deep, the greatest depth of body, at first dorsal spine, 3.25 in standard length; profile strongly convex, snout short, blunt, about equal to eye; head large, deep, and broad, its length greater than its depth and equal to depth of body, its greatest breadth equal to its length; eye 4.5 in head, 1.5 interorbital space; mouth small, oblique (but nearer horizontal than vertical), the maxillary extending to vertical from pupil; a row of short, wide-spaced spines or papillae on preopercle; least depth of caudal peduncle somewhat less than its length and 0.5 head; scales in longitudinal series 22.

Fins: Dorsal fins rather high, the spinous dorsal somewhat lower than the soft dorsal, whose height is about 0.8 greatest depth of body and equal to postorbital part of head; dorsal fins completely separate

[6] Fishes of the Islands of Luzon and Panay, 1907.
[7] Gobies of the Philippines and the China Sea, 1927.

but contiguous, the rays of VI–I,9; soft rays subequal, slender, deeply divided, the last ray reaching caudal when flexed; caudal broad, regularly rounded, the central rays equal to distance from middle of pupil to gill opening; anal rays I,9, similar to but lower than second dorsal, origin of fin under second soft ray of dorsal, base shorter than that of second dorsal, the flexed last ray reaching caudal; pectoral rays 19, the fins broad, rounded, longer than caudal, and reaching somewhat beyond origin of anal; ventrals short, rounded, forming a deep cup, with the rays thickened inside the cup.

Color: Body brownish red, darkest on back; abdomen pale yellow; head pale crimson; all fins except ventrals jet black, the pigment dense and opaque; ventrals black at base, dusky distally; iris green, with golden reflection.

Type.—A specimen 1.5 cm. long, taken from a coral head in shallow water at Koh Tao, Gulf of Siam, September 24, 1928. Cat. No. 90319, U.S.N.M.

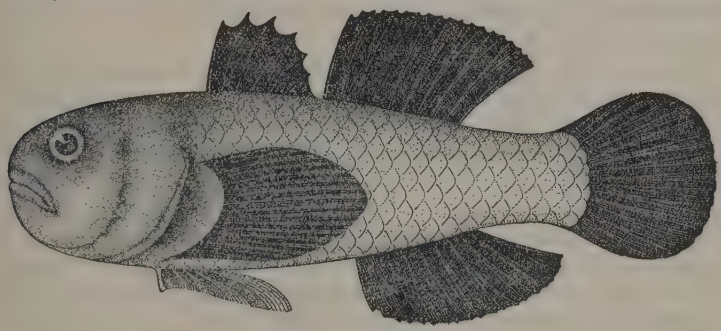

FIGURE 20.—PARAGOBIODON KERRI

Remarks.—This diminutive goby, of which only a single specimen has yet been collected, is distinguished from closely related species (*melanosomus* and *xanthosomus*) by a combination of characters. Thus, *melanosomus*, known from the east coast of Africa, Dutch East Indies, and Philippines, has 10 soft dorsal rays, 10 soft anal rays, 21 or 22 pectoral rays, and the color black or dark brown with black fins; while *xanthosomus*, from Samoa, Dutch East Indies, and Philippines, has 9 or 10 soft dorsal rays, 8 or 9 soft anal rays, 19 pectoral rays, and the color uniform yellow or green, with all of the fins pale yellow or other clear color, never black.

This little species is named for Dr. A. F. G. Kerr, Government botanist, who has made four visits to Koh Tao and has published the only account of the geography and botany of the island.

RHINOGOBIUS SIMILIS, new species

Description.—Form moderately elongate, head and body compressed; depth 4.4 in standard length; head not broader than body.

its depth 1.5 breadth, its length 3.5 in standard length; snout obtusely rounded, its dorsal profile rather steep; eyes placed high, entirely above level of mouth, 3.5 in head, slightly less than snout; interorbital space narrow, less than 0.3 eye; mouth oblique, lips rather thick, posterior angle of maxillary reaching vertical from front margin of eye; teeth in both jaws in about 4 rows, the outer row enlarged; on each side of lower jaw posteriorly a pair of large, curved canines which project in front of upper lip; least height of caudal peduncle about 0.5 its length and 0.5 head; branchial aperture restricted, extending anteriorly not more than one-third distance to vertical from posterior margin of eye; body completely covered with large, firm, angular, feebly ctenoid scales, about 28 in lateral line, 9 in transverse line between origin of second dorsal fin and anal; predorsal region as far forward as eyes and side of head above opercle covered with small crowded, irregularly arranged cycloid scales, about 21 in median line; no scales on cheeks or opercles; large cycloid scales on breast and on base of pectorals; a large pore at each end of interorbital space.

Fins: Dorsal VI–I,9; spinous dorsal low, the spines slightly produced, the longest less than depth of body; second dorsal rather low, its base less than length of head, the posterior rays reaching caudal when depressed; caudal broad, rounded, rather short, less than head; anal similar to second dorsal, its ray I,9; ventrals broad, rounded, extending nearly or quite to vent; pectorals as long as head less snout and reaching slightly beyond ventrals.

Color (in life): Body and head light brown; middle of side with 4 rather diffuse dark brown spots, the first under the spinous dorsal, the last at base of caudal fin; 4 similar dorsal spots alternating with the others; a round blackish spot about size of eye at upper end of gill opening; first dorsal fin rich brown, the color most intensive on either side of fifth and sixth rays, the fourth, fifth, and sixth membranes clear distally, and entire base of fin clear; second dorsal elaborately decorated with brown and plumbeous in transverse lines, a narrow brown border, a series of elongate plumbeous spots with a narrow colorless line above and below, a broad median band of mottled brown and plumbeous, and a basal band of plumbeous spots separated from the median band by a clear line; caudal rays brown, the membranes mostly clear; anal dusky, without definite pattern; ventrals brown, with central part slightly plumbeous; pectorals pale brown.

Type.—A specimen 7.7 cm. long taken in Bandon Bight, Gulf of Siam, September 21, 1923. Cat. No. 90320, U.S.N.M.

A second specimen 6.6 cm. long, taken at the same time and place as the type, is in the collection.

Remarks.—The specific name given to this fish is in allusion to its strong resemblance to *Rhinogobius caninus* (Cuvier and Valenciennes), known from China, Philippines, and East Indies. The principal points of dissimilarity are the more decurved snout, larger eye, nonprojecting lower jaw, absence of scales on upper part of opercle, and coloration of body and fins.

RHINOGOBIUS ATRIPINNATUS, new species

Description.—Body elongate, rather plump, moderately compressed; superior profile rising in a regular, gentle curve from snout to dorsal fin; depth under first dorsal equal to head less snout and contained 4 times in standard length; head small, 3.3 in length, its width greater than depth at eyes; eye rather small, a little less than 5 in length of head, equal to snout and greater than interorbital space; mouth oblique, rather small, lower jaw slightly projecting, posterior angle of jaws under anterior part of eye; teeth in 3 or 4 rows in each jaw, those in outer row enlarged and wide-spaced; a large, stout, backward-curved lateral canine on each side of lower jaw; tongue truncate at tip; least height of caudal peduncle 1.5 times in its length and 2 times in head; scales large, weakly ctenoid, 27 in longitudinal series, 9 in transverse series; predorsal scales small, extending into interorbital space, about 25 in median line; large scales on the somewhat fleshy base of pectorals; cheeks and lower half of opercles naked, upper half of opercles with large scales; prominent lines of mucous pores on the head, including a double row extending horizontally entirely across middle of cheek, 3 rows on lower part of cheek, a suborbital row continuous with a postorbital row extending along upper margin of opercle to upper angle of gill opening.

Fins: Dorsal rays VI–I,10; anal rays I,10; spinous dorsal rather low; soft dorsal similar to anal, neither when depressed reaching caudal; ventrals rather short, extending about two-thirds distance to anal; pectorals longer than ventrals and equal to head less snout.

Color: Body and head light brown, without markings; muzzle blackish; all fins black except pectorals which are dusky.

Type.—A specimen 6 cm. long, taken in the Gulf of Siam off the Tachin River, Central Siam, December 14, 1927. The fish is a female with well-developed ovaries. Cat. No. 90321, U.S.N.M.

Remarks.—In this species the extent of the squamation of the opercles resembles *Vaimosa*, but the presence of large lateral canine teeth in the lower jaw indicates *Rhinogobius*, a genus which, as Herre [8] has pointed out, is "a catch-all for a heterogeneous assemblance not conveniently placed elsewhere."

In addition to the type, the collection of the Siamese Department of Fisheries contains a specimen 6 cm. long taken in the Menam

[8] Gobies of the Philippines and the China Sea.

and equals length of head without snout, fifth and sixth spines shortest; second dorsal rather low, the rays of nearly equal length, 0.5 head, last ray shortest, its base separated from caudal by a space less than 0.5 depth of peduncle; the pointed caudal somewhat longer than head; anal I,21, similar to second dorsal, its origin posterior to second soft ray of dorsal; ventrals somewhat longer than the bluntly-pointed pectorals and extending half way to anal papilla.

Color: Light brown above, bluish-white on abdomen and under side of head; head and body with numerous small round black spots of irregular distribution, a few spots extending on base of soft dorsal fin; a series of 6 diffuse round dark brown blotches extending along middle of side from head to caudal, and 5 vertically elongate similar blotches extending downward from median line of back, alternating with the round blotches, several obscure blotches on top

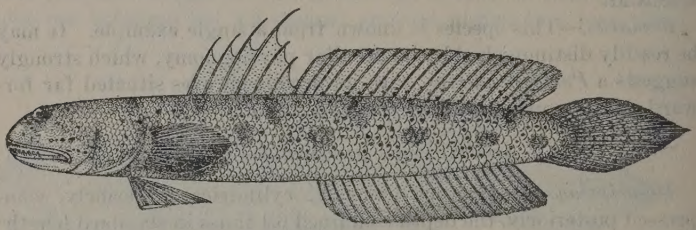

FIGURE 22.—APOCRYPTODON MALCOLMI

of head; first dorsal unmarked; caudal dusky, with faint cross-lines of brown spots; and with dusky edge; pectorals with blackish lower half.

Type.—This species is as yet known from a single specimen, 7.5 cm. long, taken June 14, 1928, at the mouth of the Chantabun River, Southeastern Siam. It is a female with well-developed ovaries. Cat. No. 90323, U.S.N.M.

Remarks.—Of the half dozen species of *Apocryptodon* known from India, Malay Archipelago, and Philippines, this species appears to be mostly closely related to *A. bleekeri* (Day). That form, however, according to Day's description and figure, has a different shaped head, longer maxillary (extending to preopercle), cheeks densely scaled as far forward as anterior margin of eye, and different coloration.

Named for Dr. Malcolm A. Smith, F. Z. S., for many years resident in Siam, in appreciation of his interest in, and important contributions to the knowledge of, the zoology of Siam.

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